

Dynamic Vision For Perception And Control Of Motion

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Since 1995 the annual international forum on Advanced Microsystems for Automotive Applications (AMAA) has been held in Berlin. The event offers a unique opportunity for microsystems component developers, system suppliers and car manufacturers to show and to discuss competing technological approaches of microsystems based solutions in vehicles. The book accompanying the event has demonstrated to be an efficient instrument for the diffusion of new concepts and technology results. The present volume including the papers of the AMAA 2005 gives an overview on the state-of-the-art and outlines imminent and mid-term R&D perspectives. The 2005 publication reflects – as in the past – the current state of discussions within industry. More than the previous publications, the AMAA 2005 "goes back" to the technological requirements and indispensable developments for fulfilling the market needs. The large part of contributions dealing with sensors as well as "sensor technologies and data fusion" is exemplary for this tendency. In this context a paradigm shift can be stated. In the past the development focused predominantly on the detection and processing of single parameters originating from single sensors. Today, the challenge increasingly consists in getting information of complex situations with a series of variables from different sensors and in evaluating this information. Smart integrated devices using the information deriving from the various sensor sources will be able to describe and assess a traffic situation or behaviour much faster and more reliable than a human being might be able to do. Additional information is available on www.amaa.de

This book constitutes the refereed proceedings of the International Workshop on Robot Vision, RobVis 2001, held in Auckland, New Zealand in February 2001. The 17 revised full papers presented together with 17 posters were carefully reviewed and selected from 52 submissions. The papers and posters are organized in topical sections on active perception, computer vision, robotics and video, computational stereo, robotic vision, and image acquisition.

A unified view of the use of computer vision technology for different types of vehicles Computer Vision in Vehicle Technology focuses on computer vision as on-board technology, bringing together fields of research where computer vision is progressively penetrating: the automotive sector, unmanned aerial and underwater vehicles. It also serves as a reference for researchers of current developments and challenges in areas of the application of computer vision, involving vehicles such as advanced driver assistance (pedestrian detection, lane departure warning, traffic sign recognition), autonomous driving and robot navigation (with visual simultaneous localization and mapping) or unmanned aerial vehicles (obstacle avoidance, landscape classification and mapping, fire risk assessment). The overall role of computer vision for the navigation of different vehicles, as well as technology to address on-board applications, is analysed. Key features: Presents the latest advances in the field of computer vision and vehicle technologies in a highly informative and understandable way, including the basic mathematics for each problem. Provides a comprehensive summary of the state of the art computer vision techniques in vehicles from the navigation and the

addressable applications points of view. Offers a detailed description of the open challenges and business opportunities for the immediate future in the field of vision based vehicle technologies. This is essential reading for computer vision researchers, as well as engineers working in vehicle technologies, and students of computer vision. By the dawn of the new millennium, robotics has undergone a major transformation in scope and dimensions. This expansion has been brought about by the maturity of the field and the advances in its related technologies. From a largely dominant industrial focus, robotics has been rapidly expanding into the challenges of the human world. The new generation of robots is expected to safely and dependably co-habitat with humans in homes, workplaces, and communities, providing support in services, entertainment, education, healthcare, manufacturing, and assistance. Beyond its impact on physical robots, the body of knowledge robotics has produced is revealing a much wider range of applications reaching across diverse research areas and scientific disciplines, such as: biomechanics, haptics, neurosciences, virtual simulation, animation, surgery, and sensor networks among others. In return, the challenges of the new emerging areas are proving an abundant source of stimulation and insights for the field of robotics. It is indeed at the intersection of disciplines that the most striking advances happen. The goal of the series of Springer Tracts in Advanced Robotics (STAR) is to bring, in a timely fashion, the latest advances and developments in robotics on the basis of their significance and quality. It is our hope that the wider dissemination of research developments will stimulate more exchanges and collaborations among the research community and contribute to further advancement of this rapidly growing field.

There has been growing acceptance of the insight that the methods so far used in the testing of visual functions have been inadequate when it comes to specific problems and should, therefore, be supplemented with more specialised methods for dynamic testing. As long as two decades ago, large-scale mass screening produced evidence to the effect that visual acuity, so far exclusively determined by means of still samples, was not identical with visual acuity in the ocular pursuit of moving targets (dynamic visual acuity). In other words, vision testing can, at present, provide little information on an individual's capability of identification, appreciation, and judgement of mobile objects. Spatial, three-dimensional perception of moving targets, hereafter referred to as dynamic stereoacuity, is the particular subject on which findings are reported in this article. Findings of that kind are of considerable relevance to everyday life, since many of the phenomena that have to be three-dimensionally perceived in private life and in occupational practice, are in movement. So far, dynamic stereoacuity has never been systematically studied and is still a blank space on the maps of ophthalmology and physiology. This is equally true for dynamic stereoscopy in binocular vision as well as for perception on the basis of movement parallax, a phenomenon of differentiated contour displacement within a given field of vision which is also available to the monocular individual under conditions of head or body or object movement within the visual space.

This book addresses a range of topics in design, such as universal design; design for all; digital inclusion; universal usability; and accessibility of technologies regardless of users' age, financial situation, education, geographic location, culture and language. It especially focuses on accessibility for people with auditory, cognitive, neurological, and visual impairments, ageing populations, and mobility for those with special physical

needs. The book explores some of the overlaps between inclusive design and web accessibility to help managers, designers, developers, policy makers, and researchers optimize their efforts in these areas. Based on the AHFE 2019 International Conference on Design for Inclusion, held on July 24-28, held in Washington D.C., USA, it discusses new design technologies and highlights the disparate needs of the individuals within a community. Thanks to its multidisciplinary approach, it provides readers with various backgrounds with a timely, practice-oriented guide to design for inclusion.

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Florian Neukart describes methods for interpreting signals in the human brain in combination with state of the art AI, allowing for the creation of artificial conscious entities (ACE). Key methods are to establish a symbiotic relationship between a biological brain, sensors, AI and quantum hard- and software, resulting in solutions for the continuous consciousness-problem as well as other state of the art problems. The research conducted by the author attracts considerable attention, as there is a deep urge for people to understand what advanced technology means in terms of the future of mankind. This work marks the beginning of a journey – the journey towards machines with conscious action and artificially accelerated human evolution.

The rise of technology has led to rapid developments in robotic intelligence and its various applications. The success or failure of these systems is linked closely with effective perception and cognition models. *Aligning Perceptual and Conceptual Information for Cognitive Contextual System Development: Emerging Research and Opportunities* is an innovative source of academic content on approaches to cognitive and perceptual systems development in artificial intelligence. Including a range of relevant topics such as object processing, implicit symbols, and knowledge representation, this book is ideally designed for engineers, academics, practitioners, and students interested in perceptual and conceptual interpretation in artificial intelligence.

This book constitutes the refereed proceedings of the 21th Australasian Joint Conference on Artificial Intelligence, AI 2008, held in Auckland, New Zealand, in December 2008. The 42 revised full papers and 21 revised short papers presented together with 1 invited lecture were carefully reviewed and selected from 143 submissions. The papers are organized in topical sections on knowledge representation, constraints, planning, grammar and language processing, statistical learning, machine learning, data mining, knowledge discovery, soft computing, vision and image processing, and AI applications.

This book is the proceedings of the 9th International Symposium of Robotics Research, one of the oldest and most prestigious conferences in robotics. The goal of the symposium was to bring together active, leading robotics researchers from academia, government and industry, to define the state of the art of robotics and its future direction. The broad spectrum of robotics research is covered, with an eye on what will be important in robotics in the next millennium. An authoritative, up-to-date survey of the state of the art in artificial intelligence, written for non-specialists.

Current Trends in Narratology offers an overview of cutting-edge approaches to theories of storytelling. The introduction details how new emphases on cognitive processing, non-prose and multimedia narratives, and interdisciplinary approaches to narratology have altered how narration, narrative, and narrativity are understood. The volume also introduces a third post-classical direction of research ? comparative narratology ? and describes how developments in Germany, Israel, and France may be compared with Anglophone research. Leading international scholars including Monika Fludernik, Richard Gerrig, Ansgar Nünning, John Pier, Brian Richardson, Alan Palmer, and Werner Wolf describe not only their newest research but also how this work dovetails with larger narratological developments.

Robotic systems consist of object or scene recognition, vision-based motion control, vision-based mapping, and dense range sensing, and are used for identification and navigation. As these computer vision and robotic connections continue to develop, the benefits of vision technology including savings, improved quality, reliability, safety, and productivity are revealed. *Robotic Vision: Technologies for Machine Learning and Vision Applications* is a comprehensive collection which highlights a solid framework for understanding existing work and planning future research. This book includes current research on the fields of robotics, machine vision, image processing and pattern recognition that is important to applying machine vision methods in the real world.

The distinguished contributors to this volume have been set the problem of describing how we know where to move our eyes. There is a great deal of current interest in the use of eye movement recordings to investigate various mental processes. The common theme is that variations in eye movements indicate variations in the processing of what is being perceived, whether in reading, driving or scene perception. However, a number of problems of interpretation are now emerging, and this edited volume sets out to address these problems. The book investigates controversies concerning the variations in eye movements associated with reading ability, concerning the extent to which text is used by the guidance mechanism while reading, concerning the relationship between eye movements and the control of other body movements, the relationship between what is inspected and what is perceived, and concerning the role of visual control attention in the acquisition of complex perceptual-motor skills, in addition to the nature of the guidance mechanism itself. The origins of the volume are in discussions held at a meeting of the European Society for Cognitive Psychology (ESCOMP) that was held in Wurzburg in September 1996. The discussions concerned the landing effect in reading, an effect, that if substantiated, would provide evidence of the use of parafoveal information in eye guidance, and these discussions were explored in more detail at a small meeting in Chamonix, in February 1997. Many of the contributors to this volume were present at the meeting, but the arguments were not resolved in Chamonix either. Other leaders in the field were invited to contribute to the discussion, and this volume is the product. The argument remains unresolved, but the problem is certainly clearer.

There is a growing social interest in developing vision-based vehicle guidance systems for improving traffic safety and efficiency and the environment. Examples of vision-based vehicle guidance systems include collision warning systems, steering control systems for tracking painted lane marks, and speed control systems for preventing rear-end collisions. Like other guidance systems for aircraft and trains, these systems are expected to increase traffic safety significantly. For example, safety improvements of aircraft landing processes after the introduction of automatic guidance systems have been reported to be 100 times better than prior to installment. Although the safety of human lives is beyond price, the cost for automatic guidance could be compensated by decreased insurance costs. It is becoming more important to increase traffic safety by decreasing the human driver's load in our society, especially with an increasing population of senior people who continue to drive. The second potential social benefit is the improvement of traffic efficiency by decreasing the spacing between vehicles without sacrificing safety. It is reported, for example, that four times the efficiency is expected if the spacing between cars is controlled automatically at 90 cm with a speed of 100 km/h compared to today's typical manual driving. Although there are a lot of technical, psychological, and social issues to be solved before realizing the high density high-speed traffic systems described here, highly efficient highways are becoming more important because of increasing traffic congestion.

Artificial intelligence (AI) is a field within computer science that is attempting to build enhanced intelligence into computer systems. This book traces the history of the subject, from the early dreams of eighteenth-century (and earlier) pioneers to the more successful work of today's AI engineers. AI is becoming more and more a part of everyone's life. The technology is already embedded in face-recognizing cameras, speech-recognition software, Internet search engines, and health-care robots, among other applications. The book's many diagrams and easy-to-understand descriptions of AI programs will help the casual reader gain an understanding of how these and other AI systems actually work. Its thorough (but unobtrusive) end-of-chapter notes containing citations to important source materials will be of great use to AI scholars and researchers. This book promises to be the definitive history of a field that has captivated the imaginations of scientists, philosophers, and writers for centuries. Intelligent robotics has become the focus of extensive research activity. This effort has been motivated by the wide variety of applications that can benefit from the developments. These applications often involve mobile robots, multiple robots working and interacting in the same work area, and operations in hazardous environments like nuclear power plants. Applications in the consumer and service sectors are also attracting interest. These applications have highlighted the importance of performance, safety, reliability, and fault tolerance. This volume is a selection of papers from a NATO Advanced Study Institute held in July 1989 with a focus on active perception and robot vision. The papers deal with such issues as motion understanding, 3-D data analysis, error minimization, object and environment modeling, object detection and recognition, parallel and real-time vision, and data fusion. The paradigm underlying the papers is that robotic systems require repeated and hierarchical application of the perception-planning-action cycle. The primary focus of the papers is the perception part of the cycle. Issues related to complete implementations are also discussed.

This comprehensively updated and expanded revision of the successful second edition continues to provide detailed coverage of the ever-growing range of research topics in vision. In Part I, the treatment of visual physiology has been extensively revised with an updated account of retinal processing, a new section explaining the principles of spatial and temporal filtering which underlie discussions in later chapters, and an up-to-date account of the primate visual pathway. Part II contains four largely new chapters which cover recent psychophysical evidence and computational model of early vision: edge detection, perceptual grouping, depth perception, and motion perception. The models discussed are extensively integrated with physiological evidence. All other chapters in Parts II, III, and IV have also been thoroughly updated.

For many years, Artificial Intelligence technology has served in a great variety of successful applications. AI researchers have contributed much to the vision of the so-called Information Society. As early as the 1980s, some of us imagined distributed knowledge bases containing the explicable knowledge of a company or any other organization. Today, such systems are becoming reality. In the process, other technologies have had to be developed and AI-technology has blended with them, and companies are now sensitive to this topic.

The Internet and WWW have provided the global infrastructure, while at the same time companies have become global in nearly every aspect of enterprise. This process has just started, a little experience has been gained, and therefore it is tempting to re-

and try to forecast, what the next steps may be. This has given us one of the two main topics of the 23rd Annual German Conference on Artificial Intelligence (KI-99) held at the University of Bonn: The Knowledge Society. Two of our invited speakers, Helmut Willke, Bielefeld, and Hans-Peter Kriegel, Munich, dwell on different aspects with different perspectives. Helmut Willke deals with the concept of virtual organizations, while Hans-Peter Kriegel applies data mining concepts to pattern recognition tasks. The three application forums are also part of the Knowledge Society topic: "IT-based innovation for environment and development", "Knowledge management in enterprises", and

"Knowledge management in village and city planning of the information society".

Bionics evolved in the 1960s as a framework to pursue the development of artificial systems based on the study of biological systems. Numerous disciplines and technologies, including artificial intelligence and learning devices, information processing, systems architecture and control, perception, sensory mechanisms, and bioenergetics, contributed to bionics research. This volume is based on a NATO Advanced Research Workshop within the Special Programme on Sensory Systems for Robotic Control, held in Il Ciocco, Italy, in June 1989. A consensus emerged at the workshop, and is reflected in the book, on the value of learning from nature in order to derive guidelines for the design of intelligent machines which operate in unstructured environments. The papers in the book are grouped into seven chapters: vision and dynamic systems, hands and tactile perception, locomotion, intelligent motor control, design technologies, interfacing robots to nervous systems, and robot societies and self-organization.

At the dawn of the new millennium, robotics is undergoing a major transformation in scope and dimension. From a largely dominant industrial focus, robotics is rapidly expanding into the challenges of unstructured environments. Interacting with, assisting, serving, and exploring with humans, the emerging robots will increasingly touch people and their lives. The goal of this new series of Springer Tracts in Advanced Robotics is to bring, in a timely fashion, the latest advances and developments in robotics on the basis of their significance and quality. It is our hope that the greater dissemination of research developments will stimulate more exchanges and collaborations among the research community and contribute to further advancement of this rapidly growing field. As one of robotics pioneering symposia, ISRR, the "International Symposium on Robotics Research," has established over the past two decades some of the field's most fundamental and lasting contributions. With the launching of STAR, this and other thematic symposia devoted to excellence in robotics find an important platform for closer links and extended reach within the research community. The Tenth edition of "Robotics Research" edited by Raymond Jarvis and

Alex Zelinsky offers in its 11-part volume a collection of a broad range of topics in robotics. The content of these contributions provides a wide coverage of the current state of robotics research: the advances and challenges in its theoretical foundation and technology basis, and the developments in its traditional and new areas of applications.

Following the highly successful International Conference on Computer Vision - stems held in Las Palmas, Spain (ICVS'99), this second International Workshop on Computer Vision Systems, ICVS 2001 was held as an associated workshop of the International Conference on Computer Vision in Vancouver, Canada. The organization of ICVS'99

and ICVS 2001 was motivated by the fact that the majority of computer vision conferences focus on component technologies. However, Computer Vision has reached a level of maturity that allows us not only to perform research on individual methods and system components but also to build fully integrated computer vision systems of significant complexity. This opens a number of new problems related to system architecture, methods for system synthesis and verification, active vision systems, control of perception and attention, knowledge and system representation, context modeling, cue integration, etc. By focusing on methods and concepts for the construction of fully integrated vision systems, ICVS aims to bring together researchers interested in computer vision systems. Similar to the previous event in Las Palmas, ICVS 2001 was organized as a single-track workshop consisting of high-quality, previously unpublished papers on new and original research on computer vision systems. All contributions were presented orally. A total of 32 papers were submitted and reviewed thoroughly by program committee members. Twenty of them have been selected for presentation. We would like to thank all members of the organizing and program committee for their help in putting together a high-quality workshop.

Learning Control: Applications in Robotics and Complex Dynamical Systems provides a foundational understanding of control theory while also introducing exciting cutting-edge technologies in the field of learning-based control. State-of-the-art techniques involving machine learning and artificial intelligence (AI) are covered, as are foundational control theories and more established techniques such as adaptive learning control, reinforcement learning control, impedance control, and deep reinforcement control. Each chapter includes case studies and real-world applications in robotics, AI, aircraft and other vehicles and complex dynamical systems. Computational methods for control systems, particularly those used for developing AI and other machine learning techniques, are also discussed at length. Provides foundational control theory concepts, along with advanced techniques and the latest advances in adaptive control and robotics Introduces state-of-the-art learning-based control technologies and their applications in robotics and other complex dynamical systems Demonstrates computational techniques for control systems Covers iterative learning impedance control in both human-robot interaction and collaborative robots

The book is suitable for advanced courses in computer vision and image processing. In addition to providing an overall view of computational vision, it contains extensive material on topics that are not usually covered in computer vision texts (including parallel distributed processing and neural networks) and considers many real applications.

II. Sensation, Perception & Attention: John Serences (Volume Editor) (Topics covered include taste; visual object recognition; touch; depth perception; motor control; perceptual learning; the interface theory of perception; vestibular, proprioceptive, and haptic contributions to spatial orientation; olfaction; audition; time perception; attention; perception and interactive technology; music perception; multisensory integration; motion perception; vision; perceptual rhythms; perceptual organization; color vision; perception for action; visual search; visual cognition/working memory.)

Face recognition is a task that the human vision system seems to perform almost effortlessly, yet the goal of building computer-based systems with comparable capabilities has proven to be difficult. The task implicitly requires the ability to locate and track faces through often complex and dynamic scenes. Recognition is difficult because of variations in factors such as lighting conditions, viewpoint, body movement and facial expression. Although evidence from psychophysical and neurobiological experiments provides intriguing insights into how we might code and recognise faces, its bearings on computational and engineering solutions are far from clear. The study of face recognition has had an almost unique impact on computer vision

and machine learning research at large. It raises many challenging issues and provides a good vehicle for examining some difficult problems in vision and learning. Many of the issues raised are relevant to object recognition in general. This book describes the latest models and algorithms that are capable of performing face recognition in a dynamic setting. The key question is how to design computer vision and machine learning algorithms that can operate robustly and quickly under poorly controlled and changing conditions. Consideration of face recognition as a problem in dynamic vision is perhaps both novel and important. The algorithms described have numerous potential applications in areas such as visual surveillance, verification, access control, video-conferencing, multimedia and visually mediated interaction. The book will be of special interest to researchers and academics involved in machine vision, visual recognition and machine learning. It should also be of interest to industrial research scientists and managers keen to exploit this emerging technology and develop automated face and human recognition systems. It is also useful to postgraduate students studying computer science, electronic engineering, information or systems engineering, and cognitive psychology.

The Present Work Is A Rare Feat Of Critical And Candid Analysis Of The Religious Philosophies For Cleansing The Prevalent Shoddy Interpretations Of The Kernal Concepts Of Sikh Philosophy For Illuminating The Sikh Epiphany Of Ecstasy, Voluntarism And The Khalsa. This book is the second volume reflecting the shift in the design paradigm in automobile industry. It presents contributions to the second and third workshop on Automotive Systems Engineering held in March 2013 and Sept. 2014, respectively. It describes major innovations in the field of driver assistance systems and automated vehicles as well as fundamental changes in the architecture of the vehicles.

The author has maintained two open-source MATLAB Toolboxes for more than 10 years: one for robotics and one for vision. The key strength of the Toolboxes provide a set of tools that allow the user to work with real problems, not trivial examples. For the student the book makes the algorithms accessible, the Toolbox code can be read to gain understanding, and the examples illustrate how it can be used —instant gratification in just a couple of lines of MATLAB code. The code can also be the starting point for new work, for researchers or students, by writing programs based on Toolbox functions, or modifying the Toolbox code itself. The purpose of this book is to expand on the tutorial material provided with the toolboxes, add many more examples, and to weave this into a narrative that covers robotics and computer vision separately and together. The author shows how complex problems can be decomposed and solved using just a few simple lines of code, and hopefully to inspire up and coming researchers. The topics covered are guided by the real problems observed over many years as a practitioner of both robotics and computer vision. It is written in a light but informative style, it is easy to read and absorb, and includes a lot of Matlab examples and figures. The book is a real walk through the fundamentals of robot kinematics, dynamics and joint level control, then camera models, image processing, feature extraction and epipolar geometry, and bring it all together in a visual servo system. Additional material is provided at <http://www.petercorke.com/RVC>

Die DAGM '99 steht unter dem Thema "Interpretation natürlicher Szenen: Von der medizinischen Bildverarbeitung bis zur Fernerkundung". Dieses Motto greift aktuelle Entwicklungen in der Mustererkennung auf, intelligente Datenanalyse für große Datensätze zu betreiben und damit der Wissensgesellschaft neuartige Analysewerkzeuge für natürliche Szenen, aber auch für Data Mining zur Verfügung zu stellen. Im Tagungsband finden sich sowohl neue Entwicklungen auf dem Gebiet der Grundlagenforschung als auch interessante Anwendungen aus allen Bereichen der Mustererkennung wieder, wobei neben der Sprachverarbeitung vor allem Beiträge zu statistischen Verfahren, zur Analyse von Bildfolgen und zur Rekonstruktion der 3D-Geometrie aus Bildern dominieren.

This volume contains papers presented at two successful workshops integral to the IMA annual program on Mathematics in Multimedia, 2000- 2001: Image Processing and Low Level Vision, and Image Analysis and High Level Vision.

This book on autonomous road-following vehicles brings together twenty years of innovation in the field. The book uniquely details an approach to real-time machine vision for the understanding of dynamic scenes, viewed from a moving platform that begins with spatio-temporal representations of motion for hypothesized objects whose parameters are adjusted by well-known prediction error feedback and recursive estimation techniques.

Deep learning algorithms have brought a revolution to the computer vision community by introducing non-traditional and efficient solutions to several image-related problems that had long remained unsolved or partially addressed. This book presents a collection of eleven chapters where each individual chapter explains the deep learning principles of a specific topic, introduces reviews of up-to-date techniques, and presents research findings to the computer vision community. The book covers a broad scope of topics in deep learning concepts and applications such as accelerating the convolutional neural network inference on field-programmable gate arrays, fire detection in surveillance applications, face recognition, action and activity recognition, semantic segmentation for autonomous driving, aerial imagery registration, robot vision, tumor detection, and skin lesion segmentation as well as skin melanoma classification. The content of this book has been organized such that each chapter can be read independently from the others. The book is a valuable companion for researchers, for postgraduate and possibly senior undergraduate students who are taking an advanced course in related topics, and for those who are interested in deep learning with applications in computer vision, image processing, and pattern recognition.

This book revolutionizes how vision can be taught to undergraduate and graduate students in cognitive science, psychology, and optometry. It is the first comprehensive textbook on vision to reflect the integrated computational approach of modern research scientists. This new interdisciplinary approach, called "vision science," integrates psychological, computational, and neuroscientific perspectives. The book covers all major topics related to vision, from early neural processing of image structure in the retina to high-level visual attention, memory, imagery, and awareness. The presentation throughout is theoretically sophisticated yet requires minimal knowledge of mathematics. There is also an extensive glossary, as well as appendices on psychophysical methods, connectionist modeling, and color technology. The book will serve not only as a comprehensive textbook on vision, but also as a valuable reference for researchers in cognitive science, psychology, neuroscience, computer science, optometry, and philosophy.

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