



کراچی یونیورسٹی

*University of Karachi*

**PROFORMA FOR THE SUBMISSION OF RESARCH PROPOSAL TO  
FACULTY OF SCIENCE**

Math/Dean.Grant/2007-  
May 15, 2007

Name and Address of the Principal Investigator: Professor Dr. Syed Arif Kamal, Professor, Department of Mathematics, University of Karachi, Karachi 75270

Title of the Project: Pattern Recognition using Rasterstereography

Main Field of Study: Computer Vision

Nature of the Project: Applied  
(i. e., Basic OR Applied)

Funds Requested: Rs 82 000/= (Rupees Eighty Two Thousand Only)

Signatures of the Principal Investigator: \_\_\_\_\_

Endorsement by the Chairman/Director: \_\_\_\_\_

Tel: 9926 1300/2380

Prof Dr SA Kamal

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*Diary No. Math/Dean.Grant/2007-7910 Dated May 15, 2007*

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*Page 1 of 5*

**Title** **Pattern Recognition using Rasterstereography**

**Submitted to** Dean, Faculty of Science, University of Karachi

**Date of Submission** Tuesday, May 15, 2007

**Diary Number** Math/Dean.Grant/2007-7910

**Principal Investigator** **Professor Dr. Syed Arif Kamal**  
MA (Johns Hopkins, USA); MS (Indiana, Bloomington, USA); PhD  
Professor, Department of Mathematics  
Project Director, the NGDS Pilot Project  
Program Convener, the Early Talent Research Participation Program  
UNIVERSITY OF KARACHI  
Convener, National Curriculum Revision Committee in Mathematics  
HIGHER EDUCATION COMMISSION

**Telephone** 9926 1300-6 ext. 2293 (secretary), 2380 (direct)

**Address for Courier Delivery** Room No.G-5, Department of Mathematics, University of Karachi, Karachi 75270; Telephone Number 926 1300-6 ext. 2380

**Paper Mail** Department of Mathematics, University of Karachi, Karachi 75270

**e-mail** kamal(at the rate of)ngds-ku.org

**Homepage** <http://ngds-ku.org/kamal>

**Introduction** **a) Background of the Problem:**  
Determination of curvatures is a very important problem in face recognition, detection of trunk deformities and flat-foot problems. Most of these surfaces are not accessible through traditional measuring techniques, *e. g.*, pantograph.  
**b) Significance of the Problem**  
The accurate determination of curvature is one of the biometric identifiers, needed in recognition of individuals in databases, criminal investigations, plastic surgery of face as well as computerized construction of braces to arrest spinal curvatures.  
**c) Need for Solution:**  
There is a dire need of hardware and soft wares to be developed to generate curvatures at each point of a given surface. These curvatures, along with height maps (generated from moiré fringe topography), shall reconstruct the surface.

**Statement of the Problem** Setup of hardware and development of software to be able to on-line compute curvatures of an arbitrary shape and reconstruct the surface from curvature and height information.

**Proposed Solution** Curvature maps of human face and body are to be generated, which are to be used as biometric identifiers and diagnostic tool for management of trunk deformities.

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**Methodology** Accuracy, precision and reproducibility of the techniques shall be determined by computing curvatures of standard objects, *e. g.*, cylinder, sphere. Once, the techniques are validated, formulae shall be developed to compute curvatures of human face and foot, *etc.*

- Resources**
- a) **Necessary Facilities Required**
- i) Powerful Computing
  - ii) Scanning
  - iii) Image Processing
- b) **Facilities Available**
- i) Wordprocessing
  - ii) Printing
  - iii) e-mail
  - iv) Internet

- Schedules**
- a) **Start Date**  
June 1, 2007
- b) **Finish Date**  
May 31, 2008
- c) **Submission of Reports**  
Final Report (upon completion of project)  
Audited Statement of Accounts (upon completion of project)

Estimated Budget	<i>Description</i>	<i>Amount (in Rupees)</i>
	Computer Accessories	Rs 10000.00
	Image-Processing Hardware	Rs 30000.00
	Image-Processing Software	Rs 15000.00
	Professional Society Membership	Rs 7000.00
	Books/Journals/Literature	Rs 10000.00
	Conference Registration/Stationery	Rs 10000.00
	<i>Total</i>	<b>Rs 82000.00</b>
		<b>(Rupees Eighty Two Thousand Only)</b>

- Benefits/Usefulness**
- i) To develop suitable biometric identifiers using curvature maps for use by NADRA and other agencies
  - ii) To reconstruct face using plastic surgery from previously-stored curvature information
  - iii) To construct efficient braces for arresting scoliosis without causing discomfort and pressure sores

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Diary No. Math/Dean.Grant/2007-7910 Dated May 15, 2007

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Page 3 of 5

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Diary No. Math/Dean.Grant/2007-7910 Dated May 15, 2007

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**Qualifications**

Biodata and Comprehensive List of Publications enclosed.

*Web address of this document:* <http://www.ngds-ku.org/DFS/DFS2007.pdf>

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*Page 5 of 5*