

# ROYA HOSSEINI

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## RESEARCH INTERESTS

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Personalized E-Learning, Educational data mining, Open learner modeling, Intelligent tutoring systems, Learning analytics.

## EDUCATION

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- Ph.D.: Intelligent Systems Program,** *Aug. 2012 - Aug. 2018 (Expected)*  
University of Pittsburgh, Pittsburgh, PA (GPA: 3.8/4)
- M.S.: Intelligent Systems,** *Aug. 2012 - Aug. 2015*  
University of Pittsburgh, Pittsburgh, PA (GPA: 3.8/4)
- M.S.: Information Technology Engineering (e-Commerce),** *Sep. 2009 - Jan. 2012*  
Amirkabir University of Technology, Tehran, Iran (GPA: 18.45/20)
- B.S.: Information Technology Engineering,** *Sep. 2005 - Sep. 2009*  
Shiraz University of Technology, Shiraz, Iran (GPA: 17.63/20)

## RESEARCH EXPERIENCE

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**PAWS Laboratory, University of Pittsburgh, Pittsburgh, PA** *Fall 2012 - Present*  
Working under advisory of Dr. Peter Brusilovsky on:

- personalized learning and adaptive guidance in adaptive educational systems:
  - designed and implemented the recommendation engine for Mastery Grids system to provide content-based recommendation of learning materials in the programming domain. My focus was on two major approaches for recommending learning materials: *reactive* and *proactive* recommendations. In the *reactive* approach, the recommender system activates in reaction to the student's activity, e.g. if the student fails in solving a quiz, the reactive recommender system recommends related examples to this student to help her understand the skills required to solve that quiz ([Demo](#)). The *proactive* recommender system, proactively suggests next best learning materials to student based on her previous attempts and knowledge level in the domain concept ([Read more](#)).
  - designed and implemented the recommendation service for recommending problems during exam preparation in a Knowledge Zoom system ([Demo](#)).
- developed a parser for automatic extraction of programming concepts from code snippets ([Demo](#)).
- authoring tools for creating contents and courses: worked on various types of authoring tools for the Mastery Grids project:
  - (a) content authoring tools for creating parameterized problems (developer of first version, supervise and design of future versions) ([Read more](#)), (b) content authoring tools for creating annotated examples (developer of first version, supervise and design of future versions) ([Read more](#)).
  - course authoring tool for creating adaptive courses that use the content (developer of first version, supervise and design of future versions) ([Read more](#)).
  - group authoring tool for managing users and groups (design of the tool, supervise the development) ([Read more](#)).
  - the portal to access different authoring tools (design of the tool, supervise the development) ([Read more](#)).
- open learner modeling and open social student modeling: (a) conducted A/B testing in Mastery Grids to investigate the effect of social comparison on student engagement and learning; (b) conducted judgment study to evaluate different designs for guiding students to navigate within programming examples.

- Learning analytics and educational data mining: (a) mining programming behavior from student submissions for programming exercises in a MOOC course, (b) analyzing student learning and engagement from Mastery Grids system usage data, (c) evaluating impact of integrating multiple types of contents on student learning in the domain of Python programming.

**HCII, Carnegie Mellon University, Pittsburgh, PA**

Summer 2015

Working under advisory of Dr. Noboru Matsuda on:

- cognitive task analysis
- creating cognitive tutors for discrete math primer course

## PRIZES, AWARDS, HONORS

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Andrew Mellon Predoctoral Fellowships (School of Arts and Sciences, University of Pittsburgh), 2016-2017.

Best full paper award at 10<sup>th</sup> European Conference on Technology Enhanced Education (*EC-TEL*), 2014.

Best full paper award at IEEE 13<sup>th</sup> Int. Conference on Advanced Learning Technologies (*ICALT*), 2013.

Graduate fellowship at University of Pittsburgh, 2012-2013.

Two thousands dollars award from Iran Telecommunication Research Center (ITRC) for M.S. thesis, 2012.

## PUBLICATIONS

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### Journal Papers

- [1] P. Brusilovsky, S. Somyürek, J. Guerra, R. Hosseini, V. Zadorozhny, P. Durlach, “Open Social Student Modeling for Personalized Learning”, *IEEE Transactions on Emerging Topics in Computing*, 4(3), pp. 450-461.
- [2] R. Hosseini, P. Brusilovsky, “A Study of Concept-Based Similarity Approaches for Recommending Program Examples”, *New Review of Hypermedia and Multimedia*, Under review.

### Full & Short Papers

- [1] R. Hosseini, M. Yudelson, P. Brusilovsky, A. Hellas “Stereotype Modeling for Problem-Solving Performance Predictions in MOOCs and Traditional Courses”, *Proc. of the 25<sup>th</sup> Conference on User Modeling, Adaptation and Personalization (UMAP)*, Bratislava, Slovakia, July 2017. (Full paper) (In Press)
- [2] R. Hosseini, P. Brusilovsky, “A Comparative Study of Visual Cues for Annotation-Based Navigation Support in Adaptive Educational Hypermedia”, *Proc. of the 24<sup>th</sup> ACM Conference on User Modeling, Adaptation and Personalization (UMAP)*, Halifax, Canada, July 2016, pp. 1-6. (Late Breaking Result)
- [3] N. Matsuda, M. van Velsen, N. Barbalios, S. Lin, H. Vasa, R. Hosseini, K. Sutner, N. Bier, “Cognitive Tutors Produce Adaptive Online Course: Inaugural Field Trial”, *Proc. of the 13<sup>th</sup> Int. Conference on Intelligent Tutoring Systems (ITS)*, Zagreb, Croatia, June 2016, pp. 327-333. (Short paper)
- [4] J. Guerra, R. Hosseini, S. Somyürek, P. Brusilovsky, “An intelligent Interface for Learning Content: Combining Open Learner Model and Social Comparison to Support Self-Regulated Learning and Engagement”, *Proc. of the 21<sup>st</sup> Int. Conference on Intelligent User Interfaces (IUI)*, Sonoma, California, March 2016, pp. 152-163. (Full paper)
- [5] R. Hosseini, T. Sirkiä, J. Guerra, P. Brusilovsky, L. Malmi, “Animated Examples as a Practice Content in Java Programming Course”, *Proc. of the 47<sup>th</sup> ACM technical symposium on Computer Science Education (SIGCSE)*, Memphis, Tennessee, March 2016, In Press (Full paper)
- [6] R. Hosseini, I. H. Hsiao, J. Guerra, P. Brusilovsky, “What Should I Do Next? Adaptive Sequencing in the Context of Open Social Student Modeling”, *Proc. of the 10<sup>th</sup> European Conference on Technology Enhanced Education (EC-TEL)*, Toledo, Spain, September 2015, pp. 155-168. (Full paper)
- [7] P. Brusilovsky, S. Somyürek, R. Hosseini, V. Zadorozhny, “The Value of Social: Comparing Open Student Modeling and Open Social Student Modeling”, *Proc. of the 23<sup>rd</sup> Conference on User Modeling, Adaptation and*

*Personalization (UMAP)*, Dublin, Ireland, June 2015, pp. 44-55. (Full paper)

[8] T. Loboda, J. Guerra, R. Hosseini, P. Brusilovsky, “Mastery Grids: An Open Source Social Educational Progress Visualization”, *Proc. of the 9<sup>th</sup> European Conference on Technology Enhanced Education (EC-TEL)*, Graz, Austria, September 2014, pp. 235-248. **Best Paper Award.** (Full paper)

[9] R. Hosseini, A. Vihavainen, P. Brusilovsky, “Exploring Problem Solving Paths in a Java Programming Course”, *Proc. of the 25<sup>th</sup> Psychology of Programming Interest Group (PPIG) Conference*, Brighton, UK, June 2014, pp. 65-76. (Full paper)

[10] P. Brusilovsky, D. Baishya, R. Hosseini, J. Guerra, M. Liang, “KnowledgeZoom for Java: A Concept-Based Exam Study Tool with a Zoomable Open Student Model”, *Proc. of the IEEE 13<sup>th</sup> Int. Conference on Advanced Learning Technologies (ICALT)*, Beijing, China, July 2013, pp. 275-279. **Best Paper Award.** (Full paper)

[11] M. Yudelson, R. Hosseini, A. Vihavainen, P. Brusilovsky, “Investigating Automated Student Modeling in a Java MOOC”, *Proc. of the 7<sup>th</sup> Int. Conference on Educational Data Mining (EDM)*, London, UK, July 2014, pp. 261-264. (Short paper)

[12] R. Hosseini, P. Brusilovsky, “Example-Based Problem Solving Support Using Concept Analysis of Programming Content”, *Intelligent Tutoring Systems (ITS)*, Honolulu, Hawaii, June 2014, pp. 683-685. (Young Researcher’s Track)

[13] A. Kardan, M. Fani sani, R. Hosseini, “TagAssessment: Using Tagging Technology for Learner Assessment”, *Proc. of the 3<sup>rd</sup> Int. Conference of e-Learning and e-Teaching (ICELET)*, Tehran, Iran, 2012, pp. 34-39. (Full paper)

[14] R. Hosseini, A. Kardan, “Intuitionistic Fuzzy-Based Method for Assessing the Learner’s Knowledge Level and Personalization of Learning Path”, *Proc. of the 6<sup>th</sup> Int. Conference on Virtual Learning (ICVL)*, Cluj-Napoca, Romania, September 2011, pp. 441-447. (Full paper)

[15] A. Kardan, R. Hosseini, “Personalized Content Sequencing Based on Choquet Fuzzy Integral and Item Response Theory”, *Proc. of IEEE Int. Conference on Education Technology and Computer (ICETC)*, Changchun, China, July 2011, pp. 134-138. (Short paper)

[16] A. Kardan, R. Hosseini, “Dynamic Calculation of Concept Difficulty Based on Choquet Fuzzy Integral and the Learner Model”, *Proc. of the 1<sup>st</sup> Digital Information and Communication Technology and Its Applications (DICTAP)*, Dijon, France, June 2011, pp. 517-530. (Full paper)

[17] R. Hosseini, N.G. Saryazdi, S.A.H. Golpayegani, “Supplier Selection in Webinar Supply Chain using Self-Organizing Maps and Data Mining”, *Proc. of IEEE Technology Management Conference (ITMC)*, San Jose, CA, June 2011, pp. 759-764. (Full paper)

## Workshop Papers

[1] J. Guerra, Y. Huang, R. Hosseini, P. Brusilovsky, “Exploring the Effects of Open Social Student Model Beyond Social Comparison”, *In the 4<sup>th</sup> Workshop on Intelligent Support for Learning in Groups (ISLG)*, Madrid, Spain, June 2015, pp. 19-24.

[2] J. Guerra, Y. Huang, R. Hosseini, P. Brusilovsky, “Graph Analysis of Student Model Networks”, *Proc. of the 2<sup>nd</sup> Int. Workshop on Graph-Based Educational Data Mining (GEDM)*, Madrid, Spain, June 2015, pp. 38-42.

[3] R. Hosseini, P. Brusilovsky, “JavaParser: A Fine-Grained Concept Indexing Tool for Java Problems”, *Proc. of the 1<sup>st</sup> Workshop on AI-supported Education for Computer Science (AIEDCS)*, Memphis, TN, July 2013, pp. 60-63.

## Posters

[1] R. Hosseini, P. Brusilovsky, “A Comparative Study of Visual Cues for Adaptive Navigation Support”, *Proc. of the 27<sup>th</sup> ACM Conference on Hypertext and Social Media (Hypertext)*, Halifax, Canada, July 2016, pp. 323-325.

- [2] R. Hosseini, I. H. Hsiao, J. Guerra, P. Brusilovsky, “Off the Beaten Path: The Impact of Adaptive Content Sequencing on Student Navigation in an Open Social Student Modeling Interface”, *Proc. of the 17<sup>th</sup> Int. Conference on Artificial Intelligence in Education (AIED)*, Madrid, Spain, June 2015, pp. 624-628.
- [3] T. Loboda, J. Guerra, R. Hosseini, P. Brusilovsky, “Mastery grids: An Open-Source Social Educational Progress Visualization”, *Proc. of the 19<sup>th</sup> conference on Innovation & technology in computer science education (ITiCSE)*, Uppsala, Sweden, June 2014, pp. 235-248.
- [4] R. Hosseini, P. Brusilovsky, J. Guerra, “Knowledge Maximizer: Concept-based Adaptive Problem Sequencing for Exam Preparation”, *Proc. of the 16<sup>th</sup> Artificial Intelligence in Education (AIED) Conference*, Memphis, TN, July 2013, pp. 848-851.

### White Papers

- [1] R. Hosseini “Assessing Programming Behaviors Through Evidence-Centered Design Adaptive”, *Measurement in digital environments, Analytics for Learning (A4L)*, In press.

### THESIS

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- M.S. Thesis, University of Pittsburgh** 2015  
*Under advisory of Dr. Peter Brusilovsky*  
 Example-based Problem Solving Support for Learning Programming
- M.S. Thesis, Amirkabir University of Technology** 2012  
*Under advisory of Dr. Ahmad Kardan*  
 Design and Implementation of a System for Personalization of Learning Path in the E-learning Environment
- B.S. Thesis, Shiraz University of Technology** 2009  
*Under advisory of Dr. Manijeh Keshtgary*  
 Feasibility Study on Application of Biometrics in Iran

### WORK EXPERIENCE

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- University of Pittsburgh, Pittsburgh, PA** Summer 2016  
*Student assistant in Intelligent Systems Program*
- Carnegie Mellon University, Pittsburgh, PA** Summer 2015  
*Intern at Human Computer Interaction Institute*
- University of Pittsburgh, Pittsburgh, PA** Summer 2013  
*Student assistant in Intelligent Systems Program*
- Parman Company, Tehran, Iran** 2010 - 2012  
*Software developer in the Network Management Software (NMS) group*  
 Design, develop, and maintenance of:
  - laser and synchronization module in PTS 2020, PTS 2025, and PTS 4010 systems
  - tributary protection module in PTS 4010 system
  - node registry module (frontend)
- Amirkabir University of Technology, Tehran, Iran**
  - Teaching assistant in Human Computer Interaction Tehran, Iran Spring 2012
  - Teaching assistant in E-commerce Security Tehran, Iran Fall 2011
- Telecommunication Company of Iran (TCI), Shiraz, Iran** Summer 2009  
*Intern*

### SERVICE

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- Reviewer for Springer Journal of Knowledge and Information Systems* Fall 2016 - Present
- Reviewer for Elsevier Journal of Learning and Individual Differences* Fall 2016 - Present
- Student Volunteer at SIGCSE conference* Spring 2016
- Business Manager of the Women in Information Sciences Group* Fall 2015 - Spring 2016
- Reviewer for IEEE Transactions on Learning Technologies* Summer 2015 - Present
- Subreviewer for LAK* 2016

## COMPUTER SKILLS

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*Programming Languages:* Java, ASP.Net, Visual C#, C++, Python, Matlab, R, Shell

*Databases:* MySQL, PostgreSQL, Microsoft SQL

*Data Analysis Tools:* STATA, SPSS, WEKA

## REFERENCES

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**Peter Brusilovsky** (*Professor*)

**Christian Schunn** (*Professor*)

**Yu-Ru Lin** (*Assistant Professor*)

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