

Tian Linger Xu

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EDUCATION

INDIANA UNIVERSITY

DUAL PH.D. IN COMPUTER SCIENCE
 AND COGNITIVE SCIENCE
 Sep 2018 | Bloomington, IN
 Cognitive Science Program
 Outstanding Dissertation Award and
 Outstanding Research Award

INDIANA UNIVERSITY

M.S. IN COMPUTER SCIENCE
 Dec 2012 | Bloomington, IN

NANJING UNIVERSITY

B.E. IN SOFTWARE ENGINEERING
 Jun 2009 | Nanjing, China

LINKS

Github:// [lingerxu](#)
 LinkedIn:// [lingerxu](#)
 Twitter:// [@lingerxu](#)

SKILLS

PROGRAMMING

Python (including PyTorch, tensorflow,
 scikit-learn, sktime) • Matlab • R • Java •
 C • C++ • SQL

MULTIVARIATE ANALYSIS

Granger Causality
 Cross Recurrence Analysis
 Topic Modeling in Time Series
 Multivariate Autoregressive Models
 Mixed Effect Models

WEARABLE SENSORS

Eye-tracking Calibration and Analysis
 Wireless Motion Tracking

TEACHING

ASSOCIATE INSTRUCTOR

Machine Learning
 Data Mining
 Cloud Computing
 Database Concepts
 Mastering the World Wide Web
 Introduction to Programming in Python

RESEARCH MENTOR

Supervised Research in Psychology

GUEST LECTURER

Machine Learning in Cognitive Science

RESEARCH EXPERIENCES

POSTDOCTORAL RESEARCHER Apr 2018 - present | Bloomington, IN

DISCOVERING TEMPORAL STRUCTURE AND DIRECTIONAL INFLUENCE IN MULTIMODAL INTERPERSONAL COORDINATION WITH GRANGER CAUSALITY

- Longitudinal study design to investigate the development of infant-parent social interaction as a single dynamical system
- A team science collaborative effort to collect high-density multimodal behavioral time series with dual eye-trackers, head-mounted cameras, motion trackers, speech recording and multi-view cameras
- Utilized Multivariate Autoregressive Model (MVAR) based Granger Causality and other techniques to quantify the dynamics and relations among multivariate behavioral time series

Links: [Journal paper1](#); [Github toolbox](#); [Journal paper2](#); [Conference paper](#)

PEEKBANK: AN OPEN LARGE-SCALE EYE-TRACKING DATA REPOSITORY

- Initiated and co-led cross-institutional team science project involving 20+ researchers from 10+ universities
- Proposed a unified data structure and relational schema for multi-format eye-tracking data cross systems and platforms
- Curated over 20 datasets with sample size $N > 1500$
- Provided R libraries for accessing, analyzing and validating data as well as shiny apps for visualization

Links: [Website](#); [Journal paper under review preprint](#); [Conference paper](#)

PH.D. RESEARCH Aug 2011 – Apr 2018 | Bloomington, IN

GAZE COORDINATION MODELING AND STATISTICAL LEARNING IN HUMAN ROBOT INTERACTION

- To examine the effects of different robot's gaze coordination models on eliciting active engagement and clear learning signals in human robot interaction
- Built a real-time gaze, speech, and visual stimulus contingent action execution platform with NAO humanoid robots by Aldebaran Robotics
- Implemented different statistical learning models where the robotic agents would generate different gaze, head turn and speech behaviors when aggregated statistical learning signals surpassed thresholds

Links: [Journal paper1](#); [Journal paper2](#); [Conference paper](#); [Video1](#); [Video2](#)

TOPIC MODELLING IN MULTIVARIATE TIME SERIES WITH CROSS RECURRENCE ANALYSIS

- Extending the state space in traditional Cross Recurrence Analysis (CRA) to unfold shared dynamics among multivariate time series
- Proposed a novel block representation as the underlying data structure of CRA: Cross Recurrence Blocks
- Topic modeling of time series based on k-mean clustering of such block representations
- Provided a new suite of quantitative measures to describe the details of joint activities in social interaction or among any sets of multivariate time series based on discovered topics

Links: [Conference paper](#); [Github toolbox](#); [Video1](#); [Video2](#)