Event-Based SLAM at Slamcore

2nd June 2017
Spinout with Seed Funding

Imperial College
London

imperial innovations

Amadeus Capital

TOYOTA RESEARCH INSTITUTE

SPARX Group Co., Ltd.

SLAMCORE
Founding Team

Owen Nicholson
Chief Executive Officer
Specialist in early stage R&D, innovation and Project Management
Over 10 yrs related industrial experience

Dr Stefan Leutenegger
Chief Technology Officer
Lecturer in Robot Vision at Imperial College London
Co-inventor of BRISK and OKVIS
over 30 publications and 1,700 citations, 4 patents

Jacek Zienkiewicz
VP Engineering and Product
PhD project: “Dense vision for mobile robot guidance”
Co-inventor of Multi-scale Monocular Fusion
over 5 yrs related industrial experience, 2 patents

Hanme Kim
VP Future Technologies
PhD project: “Visual SLAM with an event camera”
Co-inventor of ETAM 2D and ETAM 3D
over 12 yrs related industrial experience

Prof. Andrew Davison
Chief Scientist
Professor in Robot Vision at Imperial College London
Co-inventor of MonoSLAM, DTAM, KinectFusion and SLAM++
120 publications, over 13,000 citations, 4 patents
Simultaneous Localisation And Mapping

Where am I in the world?

What does my world look like?
Fundamental Technical Challenges
Three Key Elements of SLAM Systems

Where am I in the world?

What does my world look like?

Sensors  Processors  Algorithms
Our Approach

1. **Core SLAM**
   - modular SLAM system
   - utilising traditional and near-term novel sensors and processors

2. **Event-Based SLAM**
   - complementary sensor
   - eventually becomes module within Core SLAM

3. **Ultimate SLAM**
   - running on compact and low power platforms
   - integrate sensors, processors and algorithms closely together
Event-Based SLAM
The Potential of Event Cameras

- High Measurement Rate
- High Dynamic Range
- Low Latency
- Low Power Consumption
ETAM 2D: real-time event-based 3-DoF tracking and 2D mapping
ETAM 3D: real-time event-based 6-DoF tracking and 3D mapping
Enabling Robotic, AR and VR Systems

Highlights

rapid motion

high dynamic range

reconstruction
standard camera
reconstruction
standard camera
tracking against the gradient map directly for computationally limited platforms
The Potential of Intensity Reconstruction
intensity reconstruction comparison using three different event cameras

iniLabs DVS128 (128×128)

Insightness SER1 (346×260)

Samsung DVS Gen.2 (640×480)
event rate comparison of three different event cameras

iniLabs DVS128 (128×128)  about 0.5Meps

Insightness SER1 (346×260)  about 1Meps

Samsung DVS Gen.2 (640×480) about 2Meps
For more about us and our technologies, please visit www.slamcore.com or contact us at contact@slamcore.com

Please visit www.slamcore.com/job-opportunities or contact us at jobs@slamcore.com to join our team