

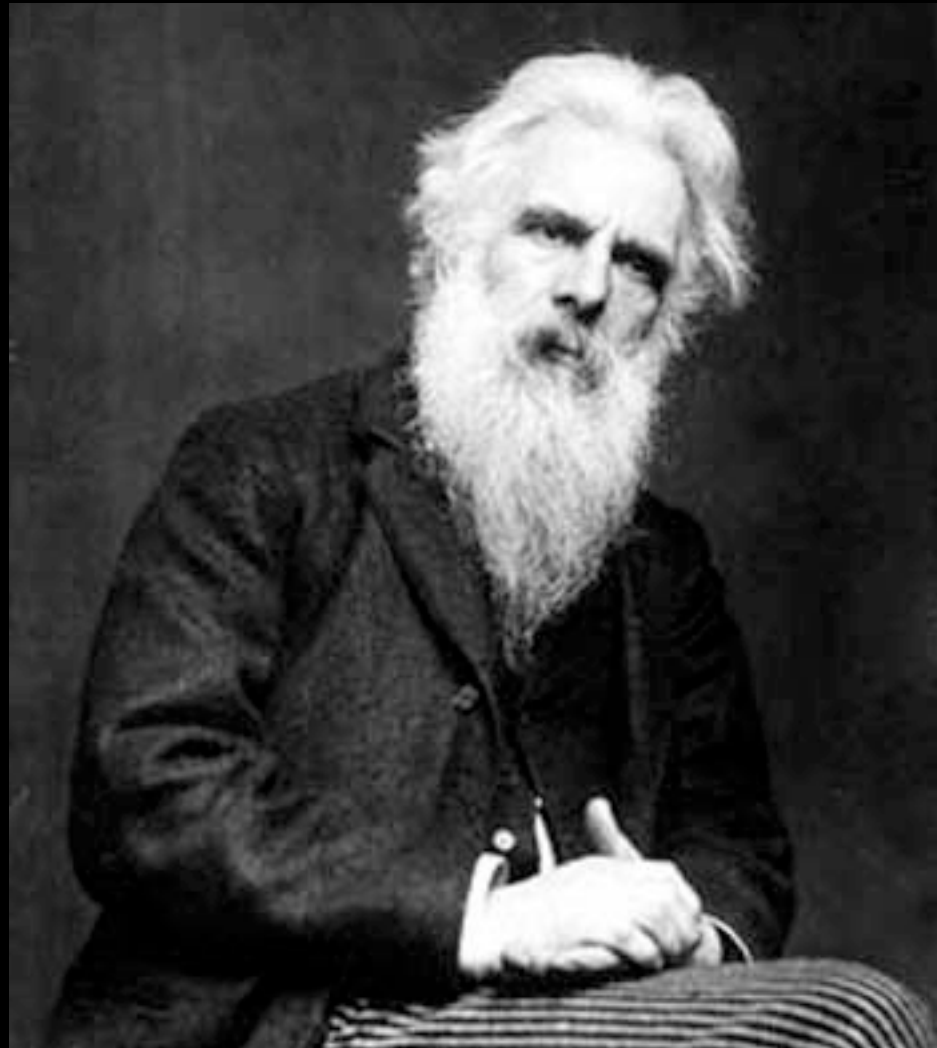
3D Motion Analysis System in Gymnastics

Proposal & Research Question

Overview

- 1 Project Description
- 2 State of the Art & Knowledge Gap
- 3 Research Question
- 4 Approach and Methods

1887



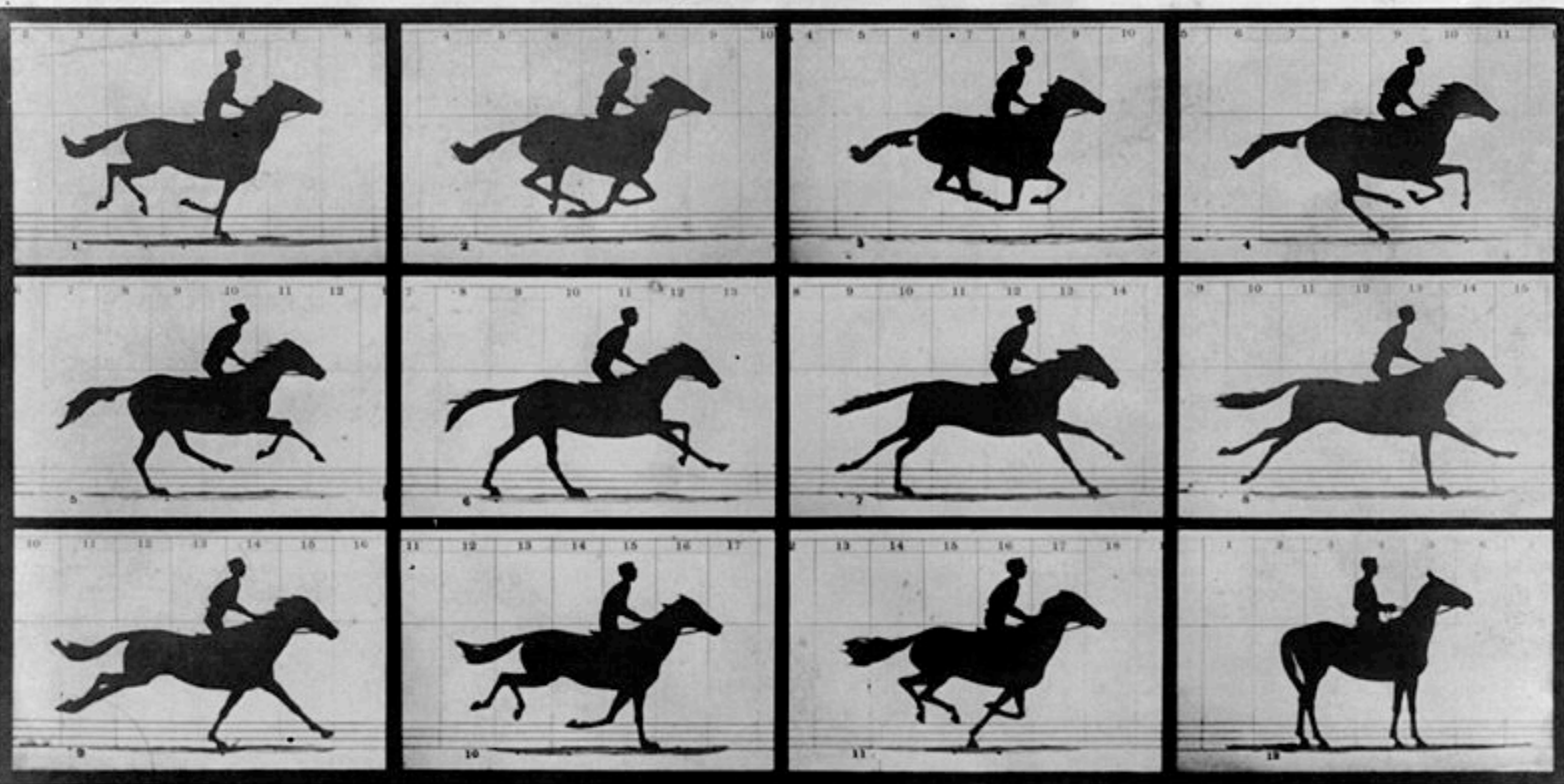
Eadweard Muybridge

British photographer

Stop-action photographs

1887:

Animal Locomotion; An Electro-Photographic Investigation of
Consecutive Phases of Animal Movement



Copyright, 1878, by MUYBRIDGE.

MORSE'S Gallery, 417 Montgomery St., San Francisco.

THE HORSE IN MOTION.

Illustrated by
MUYBRIDGE.

AUTOMATIC ELECTRO-PHOTOGRAPH.

"SALLIE GARDNER," owned by LELAND STANFORD; running at a 1.40 gait over the Palo Alto track, 19th June, 1878.

The negatives of these photographs were made at intervals of twenty-seven inches of distance, and about the twenty-fifth part of a second of time; they illustrate consecutive positions assumed in each twenty-seven inches of progress during a single stride of the mare. The vertical lines were twenty-seven inches apart; the horizontal lines represent elevations of four inches each. The exposure of each negative was less than the two-thousandth part of a second.

So What?

So What?

Begin of Motion Capture

Similar situation

3D cameras are getting cheap and accessible for everybody

New possibilities - How can we use them?

1 Project Description

Subject, Relevance & Goal

Project Description

Capture 3D motion data with Kinect

Find ways to represent and analyse this data

Create a motion analysis system to improve the training

Thematic Focus

Interdisciplinary

Interaction Design

Science of Sport and Human Movement

(Neurologie / Psychologie)

Cooperation with men's national gymnastics team

Relevance

New technology offers new possibilities

- can increase performance

- chance to neglect main point of training

Often too complicated, expensive or not suitable for environment

Applicable in other sports and different levels

2 State of the Art

& Knowledge Gap

State of The Art

Science of Sport and Human Motion

The effect of modeling and verbal feedback on skill learning - Tzetzis et al. (1999)

Can skilled performers readily change technique? - Sanders et al (1995)

Studies about best timing for feedback

Interaction Design

Design for Sport - Cereijo Roibàs et al. (2011)

State of The Art

OpenNI

Opensource project for natural interaction

Kinect as one of its input devices

Motion Analysis Software

Video analysis programs

Recreating Movement (Hilpoltsteiner 2005)



Knowledge Gap

Visual feedback is helpful, but how does a good visual feedback look like?

how to use 3D data?

Training environment not considered

3 Research Question

How can an Interactive Motion Analysis
System Improve the Training?

Research Question

How can data be represented?

How does a good visual feedback look like?

How has the system to be designed to fit the training environment?

4 Approach & Methods

Approach & Methods

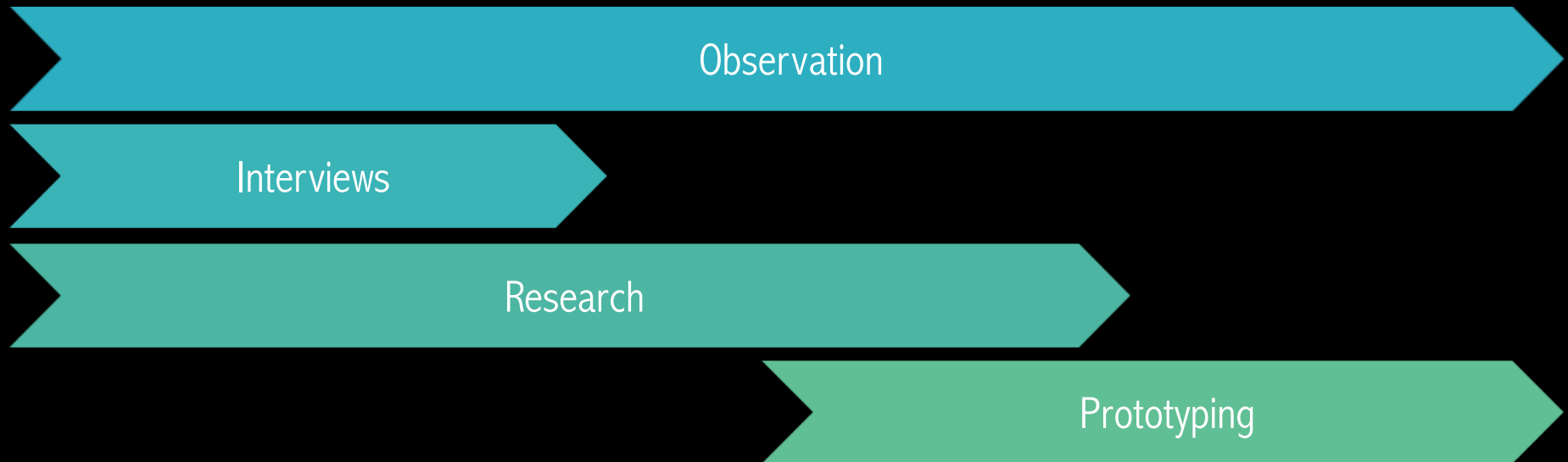
1 Observation

2 Interviews

3 Research

4 Prototyping

Workflow



Questions / Discussion

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