Advanced Motion Technologies, Inc.

Developing motion sensing devices for Virtual Athletic Training

Fareid Asphahani and Erik Roby
April 2009

Overview

- Innovation / Technology
- Potential Markets
- Running Shoe Market
- What Runners Want
- Competition Overview
- Benefit to the Shoe Company
- Plan / Risks
- Prototype Components

Innovation / Technology

- Innovation: Portable device for accurate gait analysis
  - Provides feedback on foot movement
    - Monitor Shoe/Foot Motion → Increase Athletic Performance
    - Monitor Gait Parameters → Reduce Risk of Injuries

- Technology
  - MEMS sensors integrated into shoes
    - Accelerometers → Distance, Speed, Acceleration
    - Gyroscope → Angle, Angular Speed, Angular Acceleration

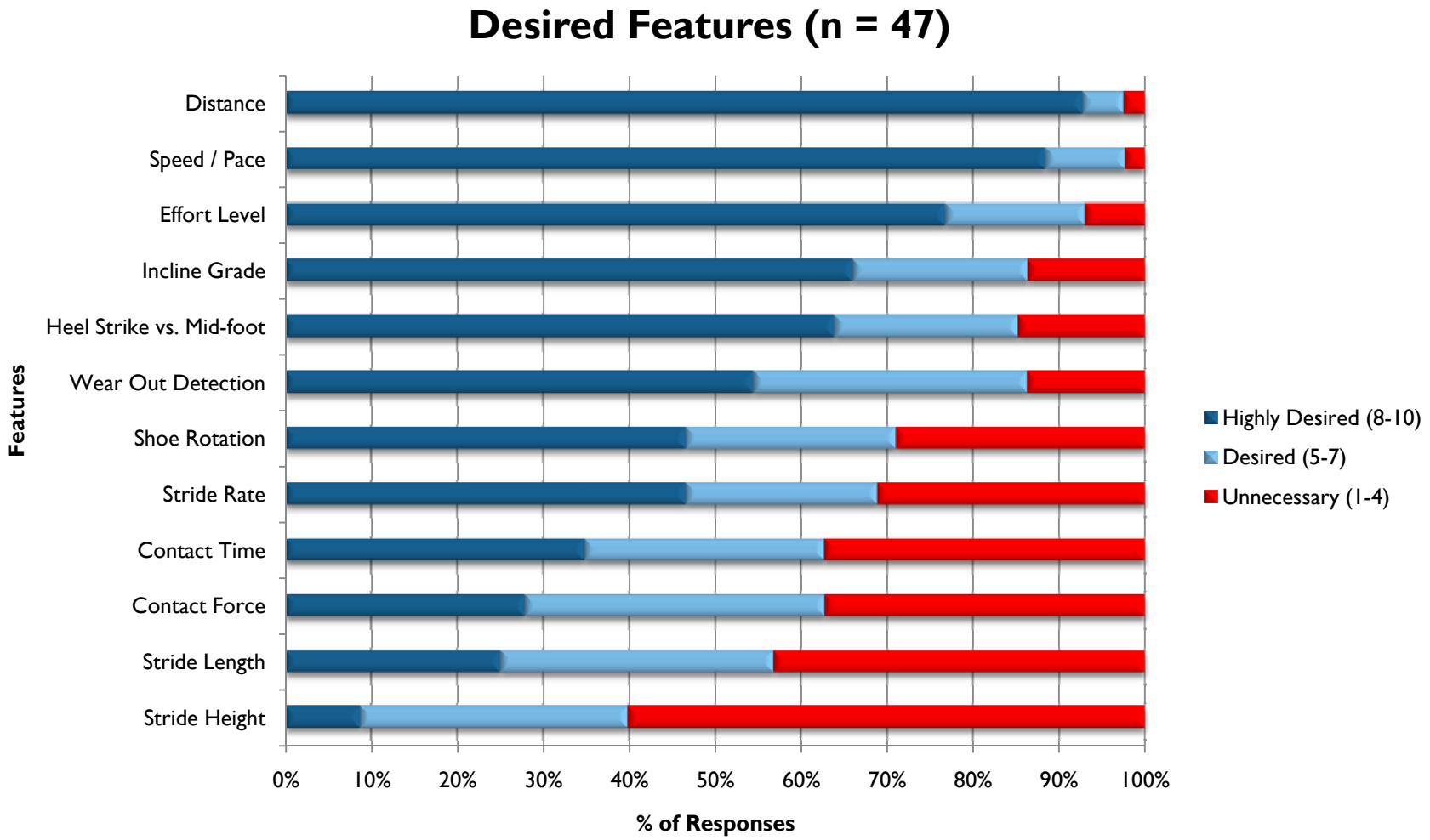
Potential Markets

- Medical Device
  - Injury Prevention
    - Military → $3.14 billion (2008) on medical costs and lost time
    - Professional Athletes → $100k's per missed game
    - Athletes → U.S. medical expenses (2000)
      - Basketball: $19.7 billion
      - Soccer: $6.7 billion
    - Elderly → U.S. (2005) injuries from falls: 1.8 million → 24% hospitalized
  - Physical Therapy
    - Alternative to Motion Capture
    - Remote Monitoring
  - Work Force
    - Insurance Claim Monitoring / Injury Prevention
- Consumer Device
  - Virtual Athletic Training
    - Running Coach

Running Shoe Market

- U.S. Running Shoe Market: $2.5 billion (2008)
- 37 million runners (U.S.)
  - 30% purchase 4 or more pairs of shoes per year
- Nike's Share: 48% → 61% in two years after Nike+ launch
- From Survey (n = 339)
  - Use Nike: 13.0%
  - Use adidas: 3.2%
  - Use Under Armour: no product at time of survey

What Runners Want



Competition Overview

Features	AMT - VAT	Nike+	GPS	miCoach
Distance, Speed	✓	✓	✓	✓
Calories Burned	✓	✓	✓	✓
Heart Rate			✓	✓
Stride Length, Stride Rate	✓			
Incline Grade	✓		☐	
Contact Time, Contact Force	✓			
Shoe Rotation, Wear Out Detection	✓			
Effort Level	✓			
Heel Strike vs Mid-foot	✓			
High Accuracy Over Distance, Map Route			✓	
Low Power Consumption		✓		✓
Low Cost	☐	✓		
Can be Used with Any Shoe		☐	✓	✓

✓ = Yes, ☐ = Somewhat

Benefit to the Shoe Company

- Device works only with approved shoes
  - Increased brand loyalty
- Help capture new customers
  - Elite runners
  - Tech-savvy runners
- Nike and adidas have products…
  - Nike and adidas want to grow their position
  - Others want to grab additional market share

Plan / Risks

- Plan
  - Develop a prototype
    - Phase I: IMU hardware
    - Phase II: Analysis software
    - Phase III: Portable UI device
  - Continue to work on:
    - IP protection
    - Business plan
    - Fundraising
  - Shop around prototype
    - Acquisition
    - Exclusive license
- Risks
  - Freedom to operate
    - Acquirer blocking IP
    - Non-acquirer blocking IP
  - End user
    - Will the target user buy it?
    - Is one shoe brand a problem?
  - Technical challenges
    - Size: must be compact
    - Power: low energy use
    - Sensitivity: sensor data range
    - Real-time processing

Prototype Components

- Components
  - Accelerometer
    - ADXL346
      - 25µA to145µA Vs = 1.8V
      - Digital outputs
      - 3mm x 3mm x 1mm
      - $3.04 @ 1,000 units
  - Gyroscope
    - ADXRS640
      - 3.5mA Vs = 5V
      - 25mV/˚ sensitivity, ±50˚ range
      - 7mm x 7mm x 3mm
      - $19.98 @ 1,000 units
- Tx
  - Blue Robin: works with Bluetooth
    - 75 µA (compare with 10 mA for Nike+)