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# New Methods For Multimodal Interaction

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# Motivation

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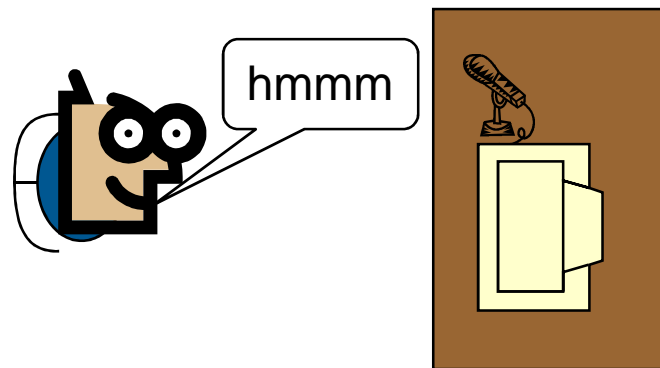
- n Conventional devices are not designed for disabled users
- n Speech recognition is not suitable for real-time control and input of analog values
  
- n Conventional devices are not designed for special purposes (like gesture communications)
- n Gesture communication is natural
- n Accelerometer is a cheap gadget that can add a great value to existing devices.



# Non-verbal Vocal Interaction (NVVI)

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- n NVVI (Non-Verbal Vocal Interaction) is a part of vocal interaction, but other sounds than speech are used such as:
  - Whistling
  - Humming



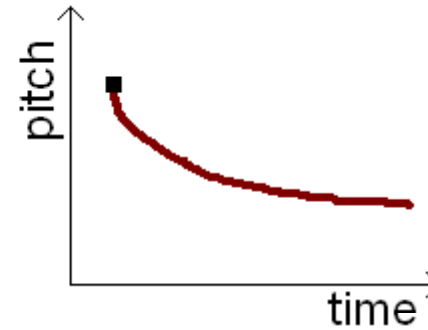
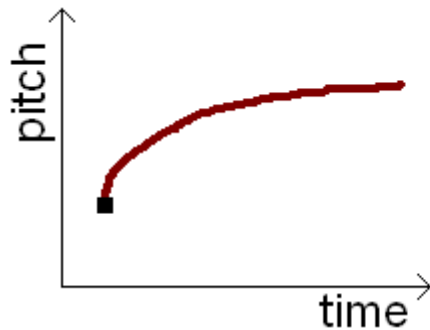
- n Video sample – mouse cursor emulation



# NVVI Approach

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- n Voice gesture: short melodic pattern of defined pitch profile and/or length, e.g.:



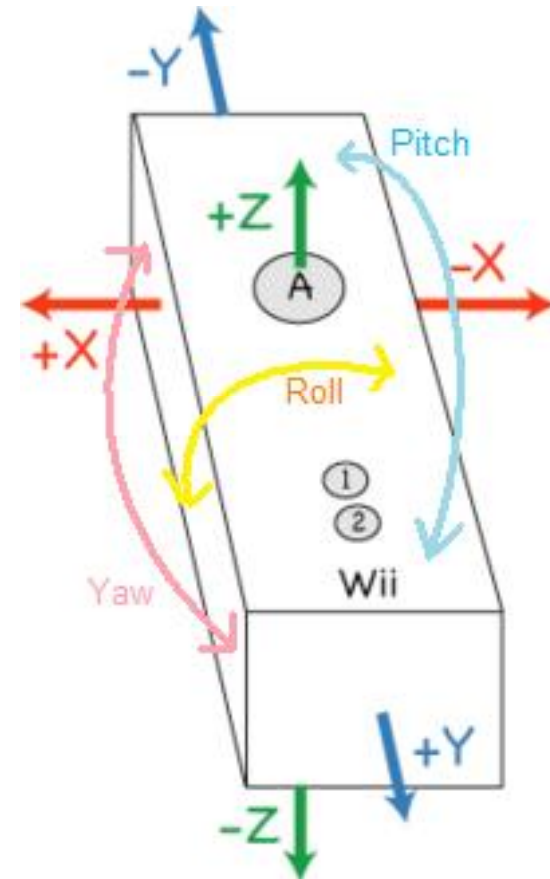
- n Use metaphors
  - move up: increasing pitch
  - move down: decreasing pitch

- n Video sample – NVVI Game



# Accelerometer-based Interaction

- n Accelerometer-based Interaction is performed by a device that can measure its acceleration
- n Nintendo Wii Remote Controller
  - Equipped with 3 accelerometers
  - Gravity force measured
- n 6 degrees of freedom:
  - 3 linear translation directions (X,Y,Z)
  - 3 rotation angles (pitch, roll, yaw)



# Accelerometer-based Interaction Approaches

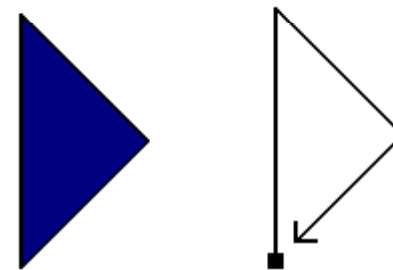
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## n Rotation

- Measuring pitch and roll
- Mouse cursor emulation
- Horizontal and vertical scrolling
- Useful when continuous change of a value is needed

## n Gestures

- Playing games
- Controlling devices at home
- Controlling GUI



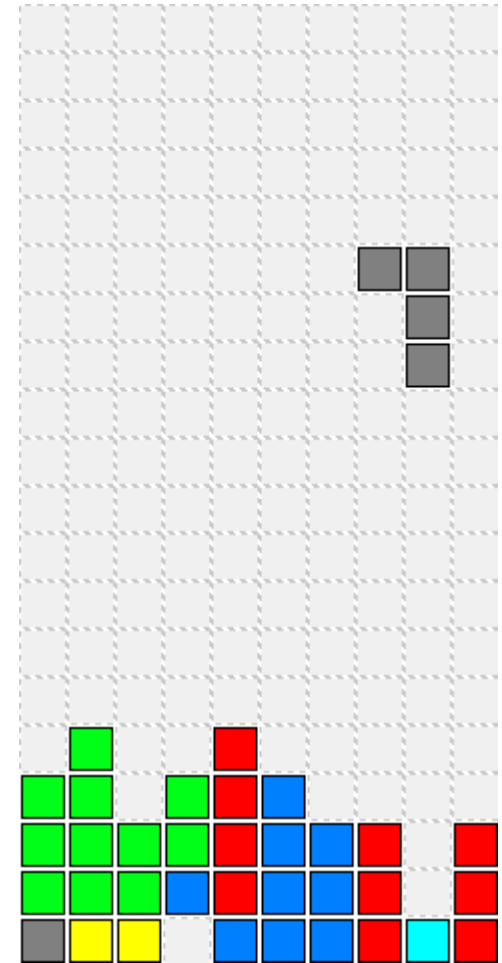
*play gesture*



# Example: Multimodal Tetris

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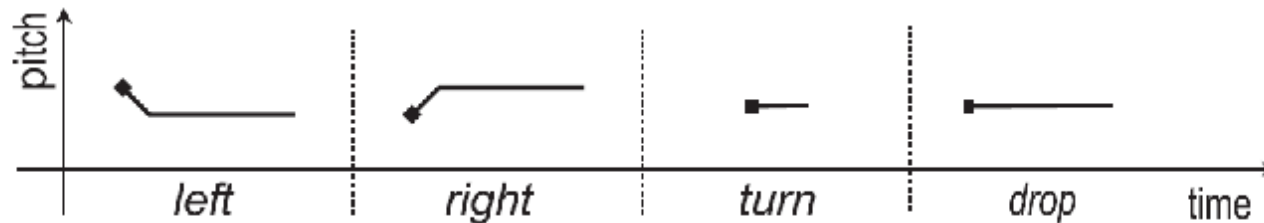
- n The falling block can be rotated or shifted to the sides
- n Blocks are randomly selected
- n When a row is completed, it is removed
- n Game ends when there is no space for a new block



# Example: Multimodal Tetris (cont.)

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## n NVVI Gestures



## n Wii Gestures:

- Move left – Swing left
- Move right – Swing right
- Turn – Swing up
- Drop – Swing down





# Vital Mind

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- n 7<sup>th</sup> framework programme project
- n Interaction with digital TV (iDTV)
- n Design of NVVI and accelerometer-based gestures control for a set-top-box environment

