



Využití HoloLens pro přesné sledování polohy zařízení třetích stran

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Project: MODULAR PLATFORM FOR AUTONOMOUS CHASSIS OF SPECIALIZED ELECTRIC VEHICLES FOR FREIGHT AND EQUIPMENT TRANSPORTATION
This project | Reg. No. CZ.02.1.01/0.0/0.0/16_025/0007293| is financially supported by the Ministry of Education, Youth and Sports of the Czech Republic and the European Union (European Structural and Investment Funds - Operational Programme Research, Development and Education)



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Očekávaný výstup



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SLAM

(Simultaneous localization and mapping)

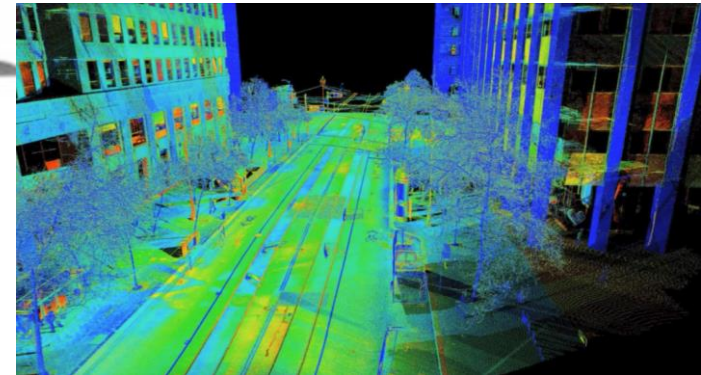
- Nutný backend



DF-DFR0315



Intel RealSense D435



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Hololens přístup

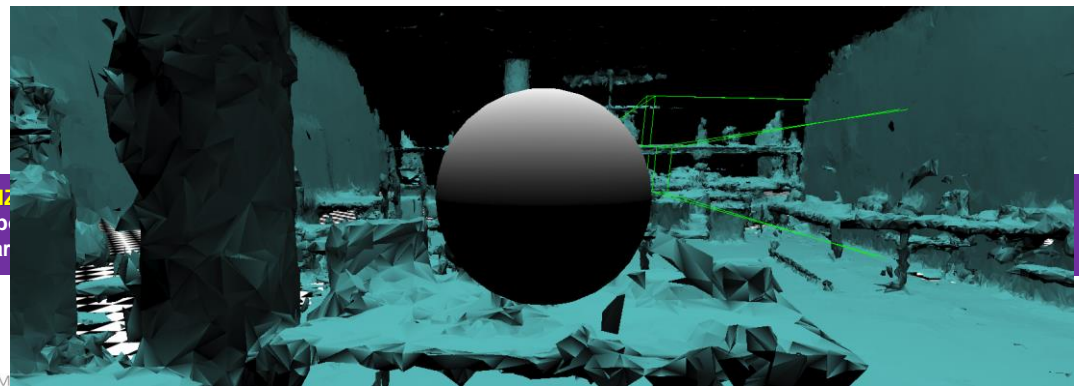
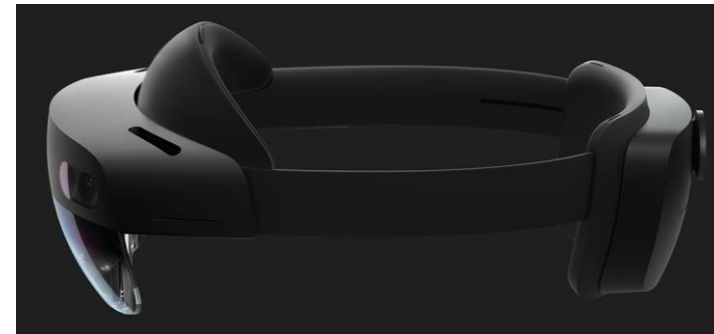
Optika

- Průhledné holografické skla (vlnovody)
- 2 HD 16:9 generátory obrazu
- Holografické rozlišení: 2.3M bodů
- Hustota bodů: >2.5k radiants (light points per radian)



Sensory

- 1 IMU (akcel, gyro, magnet)
- 4 kamery pro snímání prostředí
- 1 hloubková camera
- 2MP foto / HD video kamera
- 4 mikrofony
- 1 snímač okolního světla



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Vývoj – výhody/nevýhody



Výhody

- Připravené k použití
- Žádná infrastruktura („black box“)
- Integrovaná „real-time“ camera
- Jednoduchá možnost promítání nástaveb
- Vylepšená verze 2

Nevýhody

- Cena
- Omezený rádius
- Nový koncept

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Node-red

```
graph LR
    In[udp 8051] --> Hex[hex to ascii]
    In --> Parse[parse]
    In --> X[x]
    In --> Y[y]
    In --> RZ[rz]
    
    Hex --> Lim1[limit 1 msg/s]
    Lim1 --> InpAscii[inp ascii]
    
    Parse --> DbInsert[db insert]
    Parse --> MsgPayload[msg.payload]
    
    X --> UdpX[udp 147.230.77.112:8052]
    UdpX --> Lim2[limit 1 msg/s]
    Lim2 --> DebugX[debug x]
    
    Y --> UdpY[udp 147.230.77.112:8053]
    UdpY --> Lim3[limit 1 msg/5s]
    Lim3 --> DebugY[debug y]
    
    RZ --> UdpRZ[udp 147.230.77.112:8054]
    UdpRZ --> Lim4[limit 1 msg/s]
    Lim4 --> DebugRZ[debug rz]
    
    InpAscii --> Jc[jc]
    DbInsert --> Jc
    MsgPayload --> Jc
    DebugX --> Jc
    DebugY --> Jc
    DebugRZ --> Jc
```

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Webové rozhraní

147.230.187.146:5555/Positions/Index?xsour=-10.53&ysour=4.71&mysubmit=S&mynumber=+++++6+++++

Služba webového p... PlagScan hololens wavelet ey... TACRBednar MicroZed Chronicle... Můj výkaz VHDL Tutorial - Intr... alfico Agenda VaVpl GAČR MojeTT - Od plech... Pointers - C++ Tut...

HoloPosition Home About Contact

- 6 +

červená - brýle
zelená - žádaný cíl

Ts	X	Y	Z	Rx	Ry	Rz	Tag
9/24/2019 9:41:54 AM	0	0.07	0.09	356.69	5.94	1.89	Edit Details Delete

neco

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This project | Reg. No
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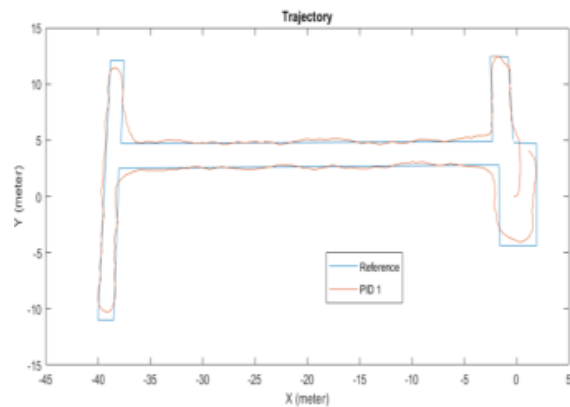
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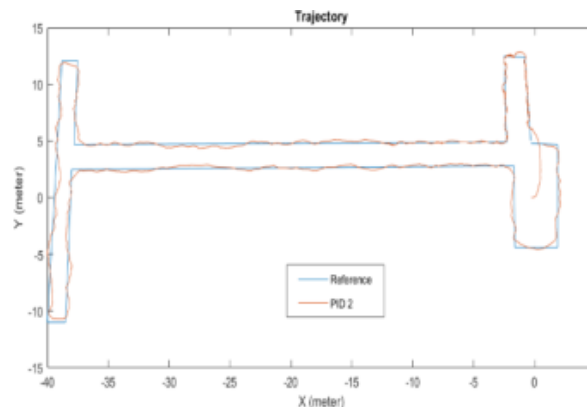


PID a MPC řízení

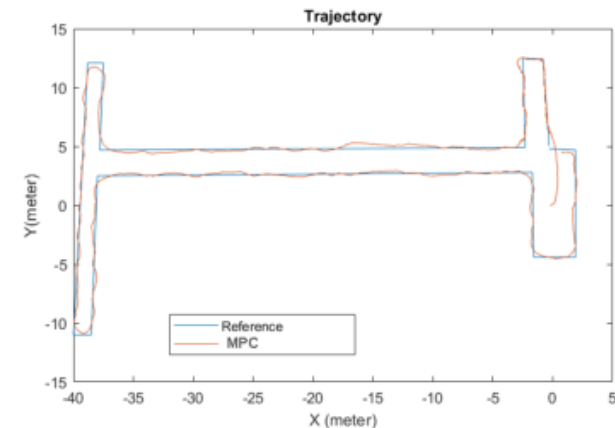
- Implementace v Matlabu přímo do Raspberry Pi
- Vytvoření rozhraní pro OPC-UA



a) PID for longitudinal direction with $P=6$, $I=0.1$, $D=0$
PID for lateral direction with $P=2$, $I=0.5$, $D=0$



b) PID for longitudinal direction with $P=3$, $I=0.2$, $D=0$
PID for lateral direction with $P=2$, $I=0.5$, $D=0$



c) PID for longitudinal direction with $P=6$, $I=0.1$, $D=0$
Model Predictive Controller in lateral direction

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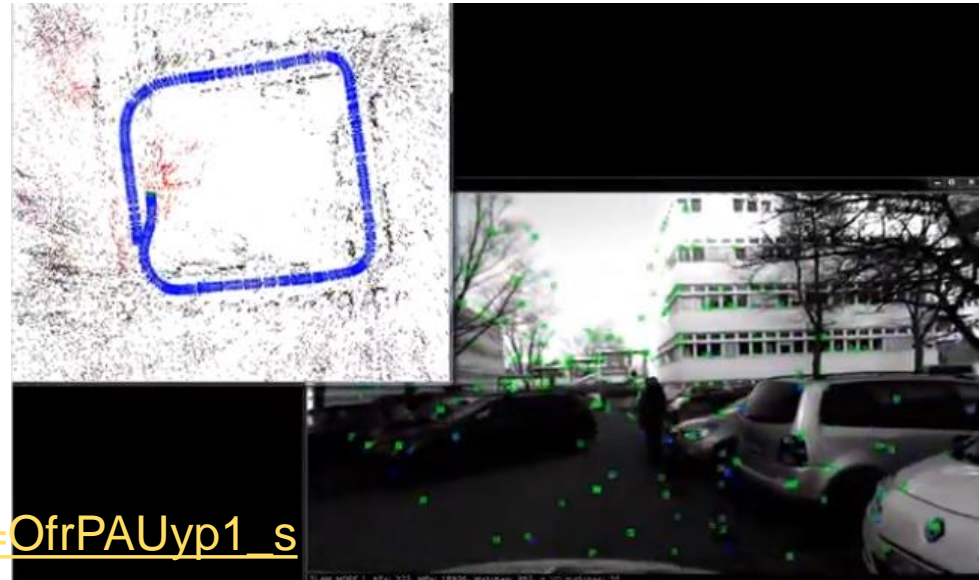
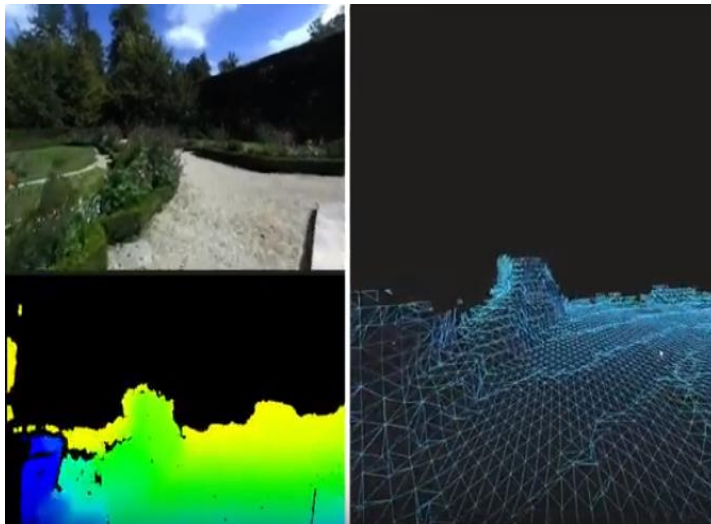


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Další možnosti – ZED camera



https://www.youtube.com/watch?v=OfrPAUyp1_s

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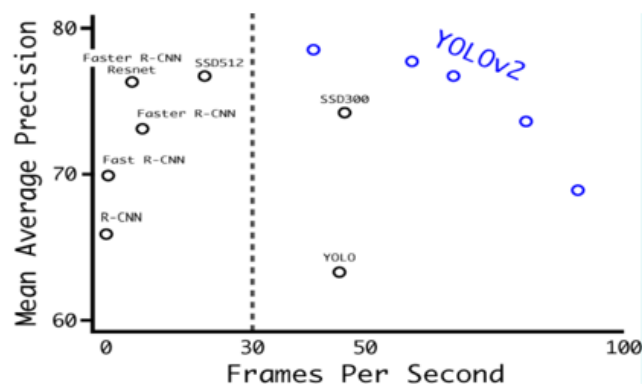
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Možnosti rozpoznávání

- Microsoft Azure Cognitive
 - » Identifikace obrázků a klasifikace
- YOLO (předchůdci CNN)



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Azure Cognitive Services



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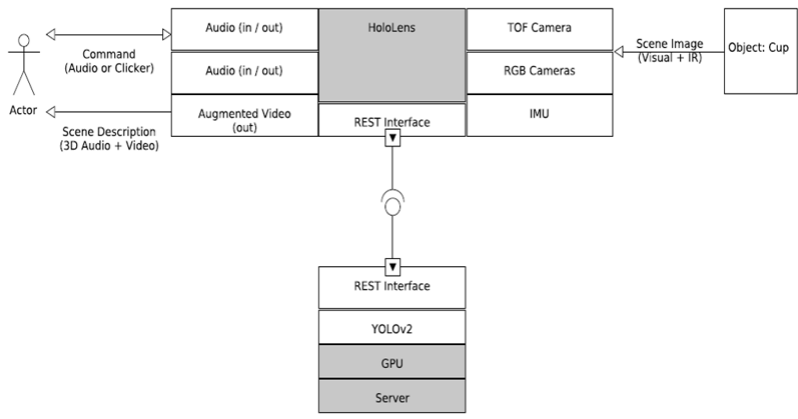
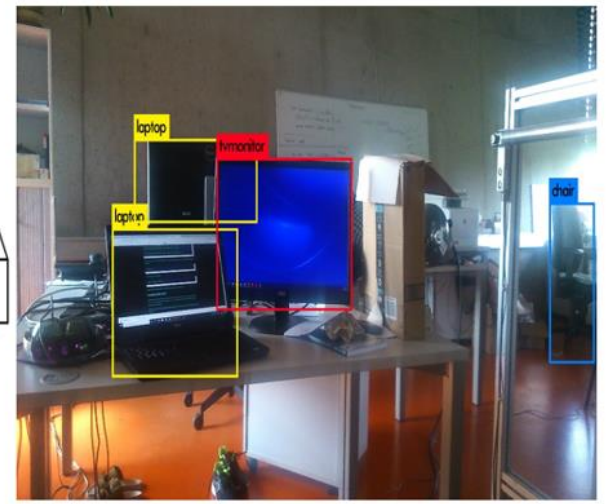
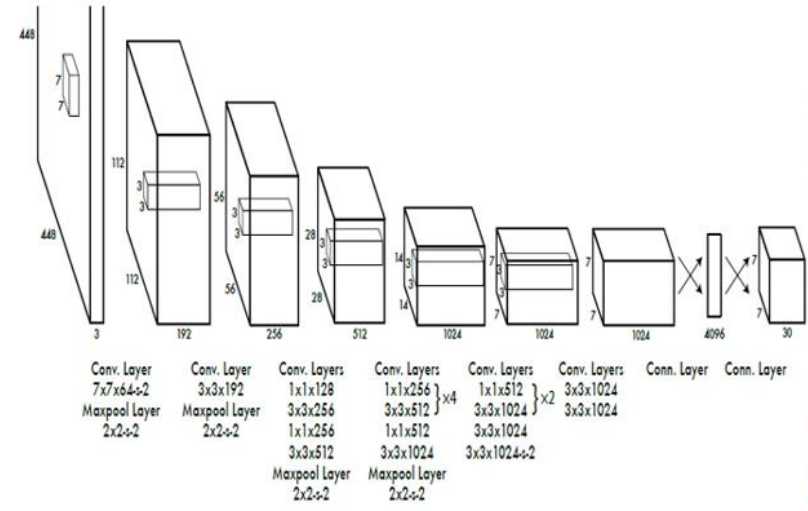


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YOLO



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Otázky?



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