A woman with dark hair tied back, wearing a light blue button-down shirt, is shown in profile, looking through a white and black VR headset. She is holding the headset with her right hand. The background is a bright, out-of-focus window with blue frames. The image is partially covered by a large, light blue circular graphic on the right side.

ENI PoC #13: Intelligent Coverage Optimization of 5G Massive MIMO BS

Rapporteur: (China Telecom)
Xueqi Yuan, Yanfen Li

Co-Rapporteur:
Haining Wang (Intel), Tong Zhang (Intel), Ribo Sun (Intel),
Kuo Liao (Intel), Wei Wen (Intel), Wei Li (Inspur), Bin Li
(Inspur)

Short Description

This PoC will provide viable solutions and methodologies for the Coverage Optimization of 5G Massive MIMO BS(Base Station) through the use of a set of AI(Artificial Intelligence)/ML(Machine Learning) algorithms based on a set of data including MR data, BS information(e.g. Engineering parameters, antenna information, etc.), geographic information (e.g. electronic map),etc. Beam management policies will be based on general and specific AI models to help BSs achieve a better coverage efficiency and minimize interference at the same time.

The proposed PoC intends to deploy, test and validate the AI-based methodology framework as those proposed by the above mentioned ENI WIs. More specifically, this PoC plans to improve radio coverage and capacity by using a transferable set of policies.

- ✓ **PoC Project Goal: Data Analysis and Policy-Based Coverage Optimization. Demonstrate the use of AI based data analysis to enable policy-based coverage optimization for Massive MIMO BS.**

ENI PoC project #13: Intelligent Coverage Optimization of 5G Massive MIMO BS

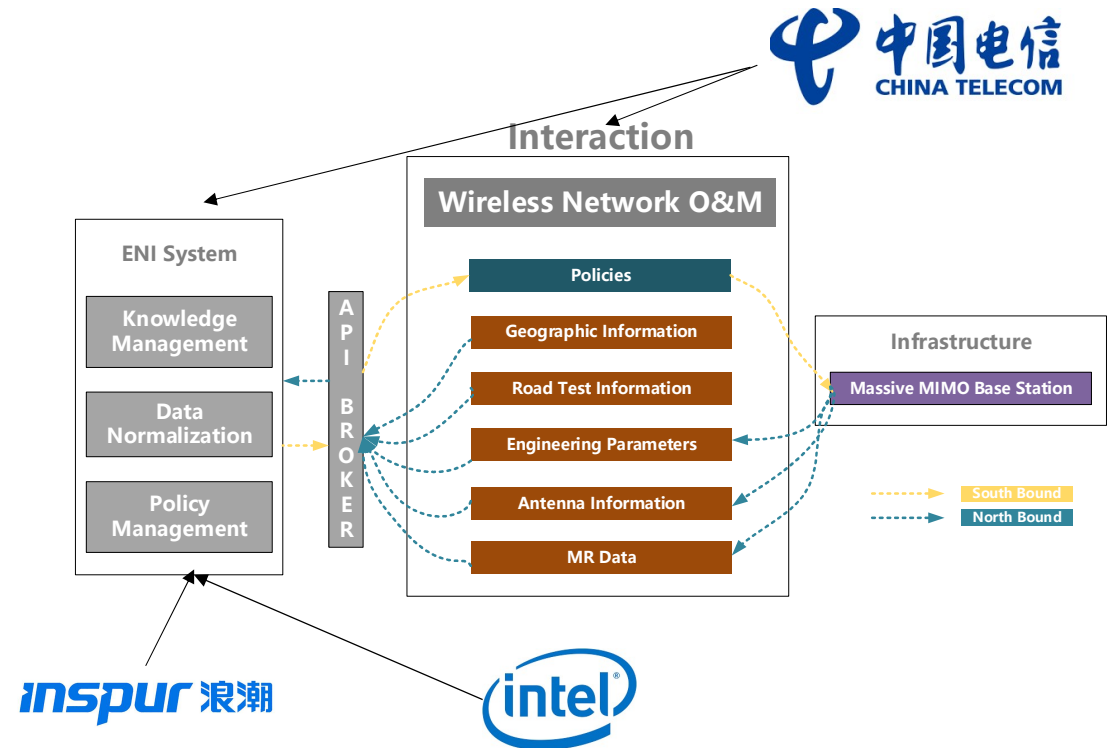


PoC Goals and PoC member task

Host/Team Leader:

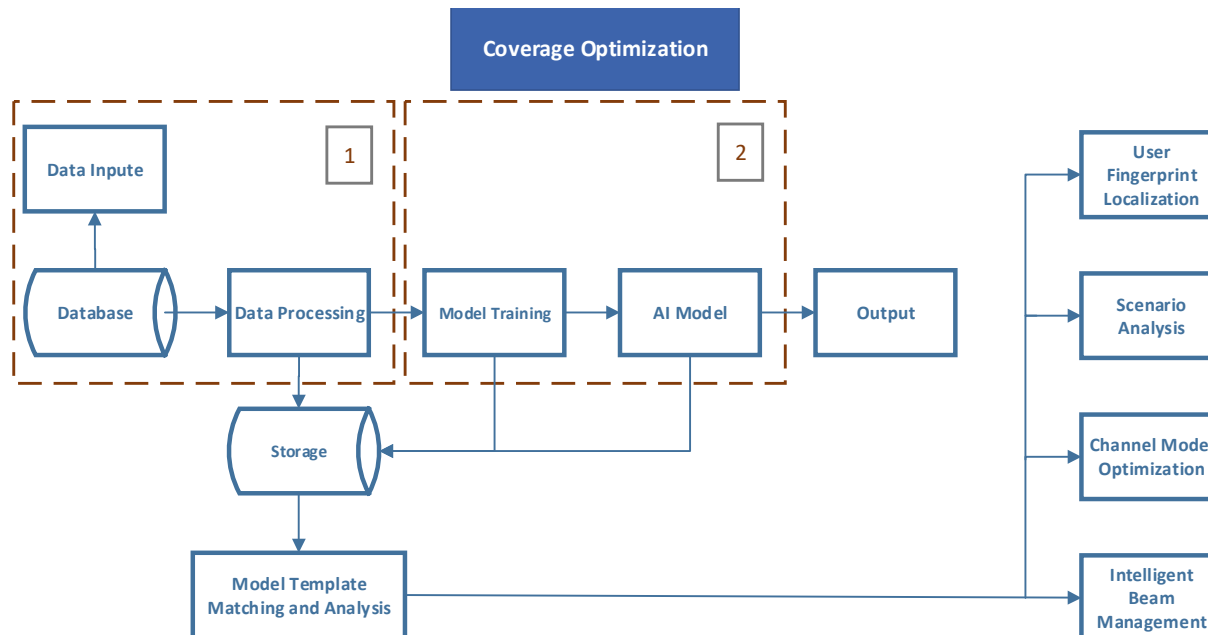


Team members:



- ✓ PoC Project Goal: Data Analysis and Policy-Based Coverage Optimization. Demonstrate the use of AI based data analysis to enable policy-based coverage optimization for Massive MIMO BS.

PoC member task



✓ China Telecom:

1. Use case development and data collection for further test.
2. PoC development and algorithm design.

✓ Intel:

1. Testbed setup and demo
2. Relative standard establishment work.
3. Implementation and optimization of AI algorithm?

✓ Inspur: UI improvement

✓ Algorithm Development

ENI PoC project #13: Intelligent Coverage Optimization of 5G Massive MIMO BS



PoC Demo

1. The login page
2. The current SSB beam information
3. The AAU information

中国电信 Massive MIMO天线波束管理系统

子波束配置信息查询

子波束配置信息列表

子波束ID	子波束名称	子波束功率	子波束方向	子波束方位	子波束高度	子波束宽度
10	40011-1170007-2	SubNetwork=1170007-2	1170007-2	1170007-2	1170007-2	1170007-2
11	40011-1170007-3	SubNetwork=1170007-3	1170007-3	1170007-3	1170007-3	1170007-3
12	40011-1170007-4	SubNetwork=1170007-4	1170007-4	1170007-4	1170007-4	1170007-4
13	40011-1170007-5	SubNetwork=1170007-5	1170007-5	1170007-5	1170007-5	1170007-5
14	40011-1170007-6	SubNetwork=1170007-6	1170007-6	1170007-6	1170007-6	1170007-6
15	40011-1170007-7	SubNetwork=1170007-7	1170007-7	1170007-7	1170007-7	1170007-7
16	40011-1170007-8	SubNetwork=1170007-8	1170007-8	1170007-8	1170007-8	1170007-8
17	40011-1170007-9	SubNetwork=1170007-9	1170007-9	1170007-9	1170007-9	1170007-9
18	40011-1170007-10	SubNetwork=1170007-10	1170007-10	1170007-10	1170007-10	1170007-10
19	40011-1170007-11	SubNetwork=1170007-11	1170007-11	1170007-11	1170007-11	1170007-11
20	40011-1170007-12	SubNetwork=1170007-12	1170007-12	1170007-12	1170007-12	1170007-12
21	40011-1170007-13	SubNetwork=1170007-13	1170007-13	1170007-13	1170007-13	1170007-13
22	40011-1170007-14	SubNetwork=1170007-14	1170007-14	1170007-14	1170007-14	1170007-14
23	40011-1170007-15	SubNetwork=1170007-15	1170007-15	1170007-15	1170007-15	1170007-15



中国电信 Massive MIMO天线波束管理系统

AAU设备配置信息查询

设备配置信息查询

设备配置信息列表

设备ID	gNodeB名称	设备名称/型号	无线制式	AAU型号	AAU功率	AAU高度	AAU方位	AAU宽度
4	NT2基站设备	NT2基站设备	1-3-1	NR	40011-1170007-2	2100000000	200	AAU
5	newNT2基站	newNT2基站	1-3-1	NR	40011-1170007-3	2100000000	200	AAU
6	newNT2基站	newNT2基站	1-3-1	NR	40011-1170007-4	2100000000	200	AAU
7	newNT2基站	newNT2基站	1-3-1	NR	40011-1170007-5	2100000000	200	AAU
8	NT2基站设备	NT2基站设备	1-3-1	NR	40011-1170007-6	2100000000	200	AAU
9	NT2基站设备	NT2基站设备	1-3-1	NR	40011-1170007-7	2100000000	200	AAU
10	NT2基站设备	NT2基站设备	1-3-1	NR	40011-1170007-8	2100000000	200	AAU

ENI PoC project #13: Intelligent Coverage Optimization of 5G Massive MIMO BS



PoC Demo

1. Poor coverage, and overlapping coverage base station exhibition
2. Coverage status quo of several base station in urban area based on collected MR data.
3. Coverage problem list of certain area



2

Massive MIMO无线波束管理系统

设备类型查询

设备类型列表

设备ID	gNodeB名称	设备名称/型号	无线制式	频率/频段	基站类型	基站功率	基站天线	基站高度	基站方位	基站倾角	基站覆盖范围	基站覆盖面积	基站覆盖人口	基站覆盖密度	基站覆盖质量	基站覆盖评价
1	gNodeB1	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
2	gNodeB2	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
3	gNodeB3	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
4	gNodeB4	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
5	gNodeB5	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
6	gNodeB6	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
7	gNodeB7	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
8	gNodeB8	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
9	gNodeB9	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							
10	gNodeB10	5G基站	NR	2100-2300 MHz	Sub6GHz	2	2100-2300 MHz	200	AAU							

1



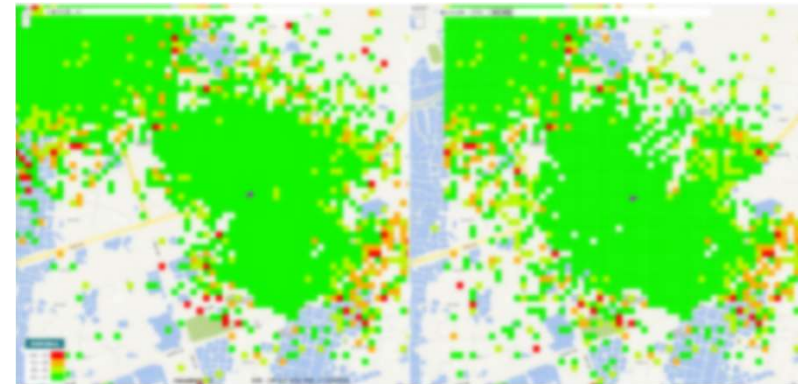
3

ENI PoC project #13: Intelligent Coverage Optimization of 5G Massive MIMO BS



PoC Demo

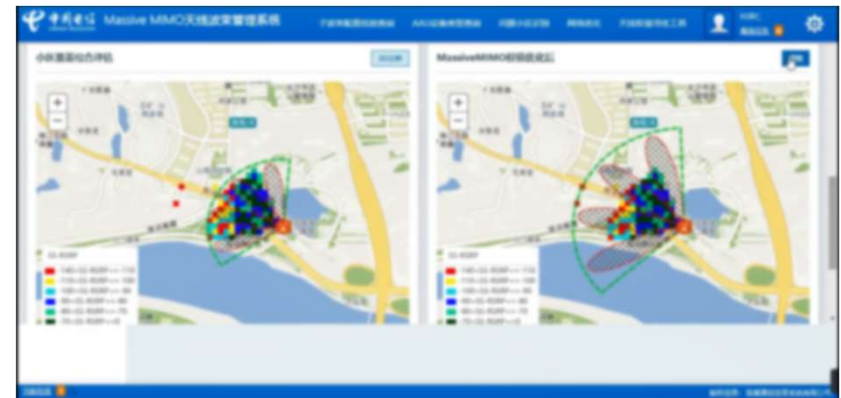
1. GIS exhibition of certain area
2. GIS exhibition of coverage status of certain area before and after coverage optimization.
3. GIS exhibition of coverage status of certain base station before and after coverage optimization, in this case is electrition tilt angle optimization.



2



1



3

ENI PoC project #13: Intelligent Coverage Optimization of 5G Massive MIMO BS

Working Arrangement

PoC Milestone	Stages/Milestone description	Target Date	Additional Info
P.S	PoC project submission	10/2020	Presentation during #ENI Rapporteur Call#160
P.S	PoC user story	12/2020	
P.TP.1	PoC Test Plan 1	03/2021	Test plan based on the user story
P.TP.2	PoC Test Plan 2	06/2021	Test of joint system and optimization
Current → P.D1	PoC Demo 1	12/2021	ETSI ENI#20
→ P.D2	PoC Demo 2	3/2022	ETSI ENI#21
P.R	PoC Report	09/2021	PoC-Project-End Feedback
P.E	PoC Project End	12/2021	Presented to ISG ENI for information

Thanks!