بسم الله الرحمن الرحیم و توکلت علی الله

1. آمار مدل CRF اجرا شده در cmd بر روی مدل آموزش یافته با ۲۵۰۰ رکورد و ۵۰۰ رکورد مجزا (ردیف ۲۰۰۰ تا ۲۵۰۰) برای تست.

کل کلاسها ۱۳ لیبل (scene\_goal وscene\_emotion هیچ رکوردی ندارند.)

کل کلاسها در خروجی ۱۱ لیبل role\_emotion و dynamic\_obejct\_action اصلا در خروجی هیچ رکوردی ندارند.

در خروجی dynamic\_object\_state و static\_object\_state هم هیچ precision and recallی ندارند.

NumericalConfusionMatrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| row NO  TIME 1  ROLE\_EMOTION 1  ROLE\_ACTION 9  NO 79  ROLE\_INTENT 20  STATIC\_OBJECT 4  ROLE\_STATE 11  DYNAMIC\_OBJECT 1  ROLE 9  LOCATION 6  STATIC\_OBJECT\_STATE 2  DYNAMIC\_OBJECT\_STATE 1 | row ROLE\_INTENT  NO 16  ROLE\_INTENT 30  ROLE\_STATE 8  ROLE 1  LOCATION 2 | row STATIC\_OBJECT  NO 5  STATIC\_OBJECT 15  LOCATION 2  ROLE 2 | row ROLE\_ACTION  NO 9  ROLE\_INTENT 1  ROLE\_STATE 3  ROLE\_ACTION 38 | row ROLE\_STATE  NO 15  ROLE\_INTENT 6  STATIC\_OBJECT 2  ROLE\_STATE 21  ROLE 4  STATIC\_OBJECT\_STATE 1  ROLE\_EMOTION 3 |
| row TIME  NO 2  TIME 13  ROLE 1  ----------------  row DYNAMIC\_OBJECT\_STATE  ROLE\_ACTION 1 | row ROLE  NO 10  ROLE\_INTENT 1  ROLE\_STATE 3  ROLE 105  LOCATION 2 | row LOCATION  NO 1  ROLE\_INTENT 1  ROLE\_STATE 1  LOCATION 21  ROLE 1  STATIC\_OBJECT\_STATE 1 | row DYNAMIC\_OBJECT  NO 2  ROLE 1  DYNAMIC\_OBJECT 2 | row STATIC\_OBJECT\_STATE  ROLE\_STATE 3 |

|  |  |  |  |
| --- | --- | --- | --- |
| sceneElem | precisions | Recalls | f-measure |
|  |  |  |  |
| ROLE | 84.68 | 86.77 | 85.71 |
| ROLE\_ACTION | 79.17 | 74.51 | 76.77 |
| ROLE\_STATE | 42.0 | 40.38 | 41.17 |
| ROLE\_INTENT | 50.85 | 52.63 | 51.72 |
| ROLE\_EMOTION | 0 | 0 | - |
| STATIC\_OBJECT | 71.42 | 62.5 | 66.66 |
| STATIC\_OBJECT\_STATE | 0.0 | 0.0 | - |
| DYNAMIC\_OBJECT | 66.67 | 40.0 | 50.00 |
| DYNAMIC\_OBJECT\_STATE | 0.0 | 0.0 | - |
| LOCATION | 63.64 | 80.77 | 71.19 |
| TIME | 92.86 | 81.25 | 86.67 |
| NO | 56.83 | 54.86 | 55.83 |

average accuracy 64.8

۲- آمار CRF آموزش یافته با دیتاست ۷۰۰۰ رکوردی که در آن جانک های حذف شده از کورپورای اولیه (۸۷۰۰ کلمه) برگردانده شده اند. از رکورد حدود ۶۰۰۰ تا ۷۵۰۰ از کورپوراس اولیه کات شدند به عنوان تست ست جدا و بقیه برای ترین به کار رفتند. تفاوت اساسی به نسبت دیتاست قبل علاوه بر برگرداند جانک ها مشخص کردن جمله ها بود، دیتاست ۳۰۰۰ قبل اصلا جمله نداشت و پیوسته بود، در حالیکه نیاز CRF‌مشخص کردن جملات بود. دقت الحمدلله به ۸۲ ارتقا یافت.

|  |  |  |  |
| --- | --- | --- | --- |
| **row STATIC\_OBJECT**  STATIC\_OBJECT 17  LOCATION 1  ROLE 6  NO 4 | **row LOCATION**  ROLE\_STATE 1  LOCATION 25  STATIC\_OBJECT 3  ROLE 3  NO 6  DYNAMIC\_OBJECT 1  ROLE\_EMOTION 1 | **row STA\_OBJ\_STATE**  STATIC\_OBJECT\_STATE 1  NO 1 | **row ROLE\_EMOTION**  ROLE\_STATE 5  ROLE\_INTENT 1  NO 2 |
| **row DYNAMIC\_OBJECT**  NO 1  DYNAMIC\_OBJECT 1 | **row ROLE\_STATE**  ROLE\_STATE 40  ROLE\_INTENT 10  TIME 1  ROLE 6  NO 24 | **row DYN\_OBJ\_STATE**  ROLE\_STATE 1 | **row ROLE\_INTENT**  ROLE\_STATE 14  ROLE\_INTENT 30  NO 26 |
| **row ROLE\_ACTION**  ROLE\_STATE 3  ROLE\_ACTION 56  NO 10 | **row TIME**  TIME 15  NO 7 | **row ROLE**  ROLE\_STATE 4  STATIC\_OBJECT 1  LOCATION 2  ROLE\_INTENT 1  ROLE 165  NO 23 | **row NO**  ROLE\_STATE 25  STATIC\_OBJECT 6  LOCATION 2  ROLE\_INTENT 16  ROLE\_ACTION 22  STATIC\_OBJECT\_STATE 1  TIME 3  ROLE 6  NO 828  DYNAMIC\_OBJECT 1 |

average accuracy 82.44

|  |  |  |  |
| --- | --- | --- | --- |
| sceneElem | precisions | Recalls | f-measure |
|  | no | no | No |
| ROLE | 88.71 | 84.18 | 86.39 |
| ROLE\_ACTION | 71.79 | 81.16 | 76.19 |
| ROLE\_STATE | 43.01 | 49.38 | 45.98 |
| ROLE\_INTENT | 51.72 | 42.86 | 46.88 |
| ROLE\_EMOTION | 0.00 | 0.00 | - |
| STATIC\_OBJECT | 62.96 | 60.71 | 61.81 |
| STATIC\_OBJECT\_STATE | 50.00 | 50.00 | 50.00 |
| DYNAMIC\_OBJECT | 33.33 | 50.00 | 40.00 |
| DYNAMIC\_OBJECT\_STATE | 0.00 | 0.00 | - |
| LOCATION | 83.33 | 62.50 | 71.43 |
| TIME | 78.95 | 68.18 | 73.17 |
| NO | 88.84 | 90.99 | 89.90 |

۳- در دیتاست قبل لیبل جانک هایی را که اضافه شدند را junk‌ گذاشتیم به جای no. علی رعم کاهش دقت کلی به ۷۸ ولی اکثر موارد pr , recall , f-measure افزایش یافت.

کاهش دقت عمده در کلاس no بود که اهمیت چندانی ندارد.

|  |  |  |  |
| --- | --- | --- | --- |
| **row: ROLE\_EMOTION**  ROLE\_INTENT 2  ROLE\_STATE 4  NO 2 | **row: DYN\_OBJ\_STATE**  NO 1 | **row: LOCATION**  JUNK 4  ROLE\_EMOTION 1  ROLE 5  DYNAMIC\_OBJECT 1  STATIC\_OBJECT 2  NO 2  LOCATION 25 | **row: ROLE\_STATE**  ROLE\_INTENT 10  JUNK 5  ROLE 7  ROLE\_STATE 44  STATIC\_OBJECT 1  NO 13  TIME 1 |
| **row: ROLE\_INTENT**  ROLE\_INTENT 35  JUNK 6  ROLE\_STATE 12  NO 17 | **row: ROLE**  JUNK 11  ROLE\_INTENT 2  ROLE 169  ROLE\_STATE 4  STATIC\_OBJECT 1  NO 7  LOCATION 2 | **row: DYN\_OBJ**  JUNK 1  DYNAMIC\_OBJECT 1 | **row: TIME**  JUNK 1  NO 4  TIME 17 |
| **row: STATIC\_OBJECT**  JUNK 2  ROLE 4  STATIC\_OBJECT 18  NO 3  LOCATION 1 | **row: STAT\_OBJ\_STATE**  STATIC\_OBJECT\_STATE 1  NO 1 | **row: ROLE\_ACTIO**  ROLE\_ACTION 60  JUNK 5  ROLE\_STATE 3  NO 1 | **row: NO**  ROLE\_ACTION 23  JUNK 46  ROLE\_INTENT 17  ROLE 9  ROLE\_STATE 19  STATIC\_OBJECT 6  NO 66  LOCATION 3 |
| ROLE\_ACTION 2  JUNK 691  STATIC\_OBJECT\_STATE 1  ROLE\_INTENT 1  ROLE 5  ROLE\_STATE 3  NO 18 |

average accuracy 78.87

|  |  |  |  |
| --- | --- | --- | --- |
| sceneElem | precisions | Recalls | f-measure |
|  | junk | junk | junk |
| ROLE | 84.92 | 86.22 | 85.57 |
| ROLE\_ACTION | 70.59 | 86.96 | 77.92 |
| ROLE\_STATE | 49.44 | 54.32 | 51.77 |
| ROLE\_INTENT | 52.24 | 50.00 | 51.10 |
| ROLE\_EMOTION | 0.00 | 0.00 | - |
| STATIC\_OBJECT | 64.29 | 64.29 | 64.29 |
| STATIC\_OBJECT\_STATE | 50.00 | 50.00 | 50.00 |
| DYNAMIC\_OBJECT | 50.00 | 50.00 | 50.00 |
| DYNAMIC\_OBJECT\_STATE | 0.00 | 0.00 | - |
| LOCATION | 80.65 | 62.50 | 70.42 |
| TIME | 94.44 | 77.27 | 85.00 |
| NO | 48.89 | 34.92 | 40.74 |
| JUNK | 89.51 | 95.84 | 92.57 |

۴- جدول با تنظيم تعداد برخی کلاسها مثل dynamic\_obejct, dynamic\_object\_state, static\_object\_state. ولی افزایش تعداد static\_object\_state دقت خاصی نشان نداد بلکه موجب افت دقت شد، لذا برگردانده شدند و فقط تعداد dynamic\_object و dynamic\_object\_state این دو اصلاح شد که بالای ۱۵٪ باشد.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| sceneElem | precisions | Recalls | f-measure | Precis-junk-num | Reca-junk-num | f-measure |
|  | junk | Junk | junk |  |  | num |
| ROLE | 84.92 | 86.22 | 85.57 | 84.51 | 85.71 | 85.11 |
| ROLE\_ACTION | 70.59 | 86.96 | 77.92 | 71.11 | 87.67 | 78.53 |
| ROLE\_STATE | 49.44 | 54.32 | 51.77 | 48.96 | 54.02 | 51.37 |
| ROLE\_INTENT | 52.24 | 50.00 | 51.10 | 49.28 | 48.57 | 48.92 |
| ROLE\_EMOTION | 0.00 | 0.00 | - | 0.00 | 0.00 | - |
| STATIC\_OBJECT | 64.29 | 64.29 | 64.29 | 66.67 | 51.43 | 58.07 |
| STATIC\_OBJECT\_STATE | 50.00 | 50.00 | 50.00 | 50.00 | 16.67 | 25.00 |
| DYNAMIC\_OBJECT | 50.00 | 50.00 | 50.00 | 75.00 | 60.00 | 66.67 |
| DYNAMIC\_OBJECT\_STATE | 0.00 | 0.00 | - | 0.00 | 0.00 | - |
| LOCATION | 80.65 | 62.50 | 70.42 | 80.00 | 58.54 | 67.61 |
| TIME | 94.44 | 77.27 | 85.00 | 91.30 | 87.50 | 89.36 |
| NO | 48.89 | 34.92 | 40.74 | 51.37 | 37.50 | 43.35 |
| JUNK | 89.51 | 95.84 | 92.57 | 89.00 | 95.96 | 92.35 |

۵- برگشت برخی مقادیر جدول، در واقع فقط اصلاح مقدار dynamic\_obejct و dynamic\_object\_state.

افزایش تعداد static\_object\_state دقت خاصی نشان نداد بلکه موجب افت دقت شد، لذا برگردانده شدند و فقط تعداد dynamic\_object و dynamic\_object\_state این دو اصلاح شد که بالای ۱۵٪ باشد.

average accuracy: 78.27

|  |  |  |  |
| --- | --- | --- | --- |
| sceneElem | precisions | Recalls | f-measure |
|  | num2 | num2 | num2 |
| ROLE | 83.98 | 87.37 | 85.64 |
| ROLE\_ACTION | 68.97 | 85.71 | 76.43 |
| ROLE\_STATE | 44.00 | 53.01 | 48.09 |
| ROLE\_INTENT | 49.25 | 47.14 | 48.17 |
| ROLE\_EMOTION | 0.00 | 0.00 | - |
| STATIC\_OBJECT | 60.00 | 64.29 | 62.07 |
| STATIC\_OBJECT\_STATE | 50.00 | 50.00 | 50.00 |
| DYNAMIC\_OBJECT | 75.00 | 60.00 | 66.67 |
| DYNAMIC\_OBJECT\_STATE | 0.00 | 0.00 | - |
| LOCATION | 81.25 | 65.00 | 72.22 |
| TIME | 94.44 | 77.27 | 85.00 |
| NO | 46.51 | 31.58 | 37.62 |
| JUNK | 90.36 | 95.52 | 92.87 |

جدول نهایی مقایسه ای

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sceneElem | precisions | Recalls | precisions | Recalls | precisions | Recalls | precisions | Recalls | f-meas | f-meas | f-mea | f-mea |
|  | no | no | junk | junk | Num | num | Num2 | Num2 | No | junk | num | num2 |
| ROLE | 88.71 | 84.18 | 84.92 | 86.22 | 84.51 | 85.71 | 83.98 | 87.37 | 86.39 | 85.57 | 85.11 | 85.64 |
| ROLE\_ACTION | 71.79 | 81.16 | 70.59 | 86.96 | 71.11 | 87.67 | 68.97 | 85.71 | 76.19 | 77.92 | 78.53 | 76.43 |
| ROLE\_STATE | 43.01 | 49.38 | 49.44 | 54.32 | 48.96 | 54.02 | 44.00 | 53.01 | 45.98 | 51.77 | 51.37 | 48.09 |
| ROLE\_INTENT | 51.72 | 42.86 | 52.24 | 50.00 | 49.28 | 48.57 | 49.25 | 47.14 | 46.88 | 51.10 | 48.92 | 48.17 |
| ROLE\_EMOTION | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - |
| STATIC\_OBJECT | 62.96 | 60.71 | 64.29 | 64.29 | 66.67 | 51.43 | 60.00 | 64.29 | 61.81 | 64.29 | 58.07 | 62.07 |
| STATIC\_OBJECT\_STATE | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 16.67 | 50.00 | 50.00 | 50.00 | 50.00 | 25.00 | 50.00 |
| DYNAMIC\_OBJECT | 33.33 | 50.00 | 50.00 | 50.00 | 75.00 | 60.00 | 75.00 | 60.00 | 40.00 | 50.00 | 66.67 | 66.67 |
| DYNAMIC\_OBJECT\_STATE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - |
| LOCATION | 83.33 | 62.50 | 80.65 | 62.50 | 80.00 | 58.54 | 81.25 | 65.00 | 71.43 | 70.42 | 67.61 | 72.22 |
| TIME | 78.95 | 68.18 | 94.44 | 77.27 | 91.30 | 87.50 | 94.44 | 77.27 | 73.17 | 85.00 | 89.36 | 85.00 |
| NO | 88.84 | 90.99 | 48.89 | 34.92 | 51.37 | 37.50 | 46.51 | 31.58 | 89.90 | 40.74 | 43.35 | 37.62 |
| JUNK |  |  | 89.51 | 95.84 | 89.00 | 95.96 | 90.36 | 95.52 |  | 92.57 | 92.35 | 92.87 |
| average accuracy |  |  |  |  |  |  |  |  | 82.44 | 78.87 |  | 78.27 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sceneElem | precisions | precisions | precisions | Recalls | precisions | Recalls | precisions | Recalls | precisions | Recalls | f-measure | f-meas | f-meas | f-mea | f-mea |
|  | Crf1 | Crf1 | no | no | junk | junk | Num | num | Num2 | Num2 | Crf1 | No | junk | num | num2 |
| ROLE | 84.68 | 84.68 | 88.71 | 84.18 | 84.92 | 86.22 | 84.51 | 85.71 | 83.98 | 87.37 | 85.71 | 86.39 | 85.57 | 85.11 | 85.64 |
| ROLE\_ACTION | 79.17 | 79.17 | 71.79 | 81.16 | 70.59 | 86.96 | 71.11 | 87.67 | 68.97 | 85.71 | 76.77 | 76.19 | 77.92 | 78.53 | 76.43 |
| ROLE\_STATE | 42.0 | 42.0 | 43.01 | 49.38 | 49.44 | 54.32 | 48.96 | 54.02 | 44.00 | 53.01 | 41.17 | 45.98 | 51.77 | 51.37 | 48.09 |
| ROLE\_INTENT | 50.85 | 50.85 | 51.72 | 42.86 | 52.24 | 50.00 | 49.28 | 48.57 | 49.25 | 47.14 | 51.72 | 46.88 | 51.10 | 48.92 | 48.17 |
| ROLE\_EMOTION | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | - |
| STATIC\_OBJ | 71.42 | 71.42 | 62.96 | 60.71 | 64.29 | 64.29 | 66.67 | 51.43 | 60.00 | 64.29 | 66.66 | 61.81 | 64.29 | 58.07 | 62.07 |
| STA\_OBJ\_STAT | 0.0 | 0.0 | 50.00 | 50.00 | 50.00 | 50.00 | 50.00 | 16.67 | 50.00 | 50.00 | - | 50.00 | 50.00 | 25.00 | 50.00 |
| DYN\_OBJECT | 66.67 | 66.67 | 33.33 | 50.00 | 50.00 | 50.00 | 75.00 | 60.00 | 75.00 | 60.00 | 50.00 | 40.00 | 50.00 | 66.67 | 66.67 |
| DYN\_OBJ\_STAT | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | - |
| LOCATI | 63.64 | 63.64 | 83.33 | 62.50 | 80.65 | 62.50 | 80.00 | 58.54 | 81.25 | 65.00 | 71.19 | 71.43 | 70.42 | 67.61 | 72.22 |
| TIME | 92.86 | 92.86 | 78.95 | 68.18 | 94.44 | 77.27 | 91.30 | 87.50 | 94.44 | 77.27 | 86.67 | 73.17 | 85.00 | 89.36 | 85.00 |
| NO | 56.83 | 56.83 | 88.84 | 90.99 | 48.89 | 34.92 | 51.37 | 37.50 | 46.51 | 31.58 | 55.83 | 89.90 | 40.74 | 43.35 | 37.62 |
| JUNK |  |  |  |  | 89.51 | 95.84 | 89.00 | 95.96 | 90.36 | 95.52 |  |  | 92.57 | 92.35 | 92.87 |
| average accuracy |  |  |  |  |  |  |  |  |  |  | 64.8 | 82.44 | 78.87 |  | 78.27 |

افزایش تعداد static\_object\_state دقت خاصی نشان نداد بلکه موجب افت دقت شد، لذا برگردانده شدند و فقط تعداد dynamic\_object و dynamic\_object\_state این دو اصلاح شد که بالای ۱۵٪ باشد.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| sceneElem | train | test | %of all | out | train | test | %of all | Out |
|  |  |  |  |  | اصلاح تعداد dynamic\_obj, dynamic\_object\_state | | | |
| ROLE | 941 | 196 | 17.24 | 199 | 939 | 198 | 17.41 | 213 |
| ROLE\_ACTION | 316 | 69 | 17.92 | 85 | 319 | 66 | 17.14 | 90 |
| ROLE\_STATE | 405 | 81 | 16.67 | 89 | 399 | 87 | 17.90 | 96 |
| ROLE\_INTENT | 312 | 70 | 18.32 | 67 | 312 | 70 | 18.32 | 69 |
| ROLE\_EMOTION | 22 | 8 | 26.67 | 1 | 22 | 8 | 26.67 | 1 |
| STATIC\_OBJECT | 143 | 28 | 16.37 | 28 | 143 | 28 | 16.37 | 27 |
| STATIC\_OBJECT\_STATE | 33 | 2 | 5.71 | 2 | 33 | 2 | 5.71 | 2 |
| DYNAMIC\_OBJECT | 31 | 2 | 6.06 | 2 | 28 | 5 | 15.15 | 4 |
| DYNAMIC\_OBJECT\_STATE | 8 | 1 | 11.11 | 0 | 7 | 2 | 22.22 | 0 |
| LOCATION | 207 | 40 | 16.19 | 31 | 207 | 40 | 16.19 | 30 |
| TIME | 90 | 22 | 19.64 | 18 | 90 | 22 | 19.64 | 23 |
| NO | 834 | 189 | 18.48 | 135 | 833 | 190 | 18.57 | 146 |
| JUNK | 3450 | 721 | 17.29 | 772 | 3435 | 736 | 17.65 | 827 |